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# PLANT

ADVANCING CANADIAN MANUFACTURING

Volume 74, No. 07 October 2015

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Thoth Technology  
innovates for the future

NEW TECHNOLOGY SECTION  
**CIEN**  
CANADIAN INDUSTRIAL EQUIPMENT NEWS

### HIGHLIGHTS

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Budget for lean successes  
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# Ontario's TPP dilemma

As we bask in the warm glow of the Trans-Pacific Partnership (TPP), what lies ahead for Canadian manufacturers, particularly in Ontario where most of them reside? The Liberal government under Premier Kathleen Wynne isn't making it easy for them to take advantage of the agreement, thus creating a bit of a dilemma.

Nationally, this massive trade deal involving 12 countries offers opportunity for manufacturers. It's supposed to open up the Asia-Pacific region to freer trade with access to 800 million consumers and 40% of the world economy. Canadian Manufacturers & Exporters, which has set a goal to double Canada's manufacturing exports by 2030, broadly supports the deal.

Without seeing the details of the agreement, the general view is Canadian companies providing services and those making higher-tech and value-added products will benefit from the improved market access, while those involved in low wage assembly and production of simple products will have a harder time of it. Everyone will be subject to more aggressive competition from abroad.

The automotive industry is a win-some, maybe lose-some situation. Large global auto parts suppliers will benefit from the access to developing markets, smaller outfits focused on the North American market will face more competition, and if Unifor's fears come to pass, may decamp to more hospitable bases of operation.

It's also an open question how enthusiastically manufacturers embrace improved access to global markets. PLANT's annual Manufacturers' Outlook survey has consistently shown most companies, particularly those in the small category, prefer to stick closer to home, servicing the Canadian market and/or the US.

There are many smaller manufacturers embarking on foreign campaigns, but size and their access to resources make these adventures challenging. Mid-sized manufacturers presumably have the potential and capacity to develop growing global markets more effectively, but they also have other barriers to export growth with which to contend.

A BDC study released in 2013 reveals more than half of the mid-sized companies disappeared between 2001 and 2010. Ontario experienced the biggest loss between 2006 and 2010 (about 25%). On average, 14% became small firms (fewer than 100 employees) while just 1.4% moved up to the large category (more than 500 employees). Respondents said availability to financing, employee acquisition and retention and fierce competition prevented them from becoming larger. And BDC cites China, the recession and a high dollar for some of the decline.

But manufacturers of all sizes in Ontario are finding the province's high costs a formidable barrier to growth at home or venturing into global markets.

They're contending with high electricity costs and the Wynne government promising rates will continue to rise. You'll also find many of these companies groaning from the weight of the Global Assessment charge on their electricity invoices (for example, one mid-sized firm was dinged almost \$100,000 for one month, more than half of the total bill). The Wynne government also plans a costly provincial pension plan that has businesses spooked, plus companies are facing a cap and trade regime that will add to their cost burdens. And provincial Chambers of Commerce are concerned the government's workplace review is generating recommendations that would result in significant changes to the Employments Standards and the Labour Relations acts, increasing further the cost of doing business.

High costs make it difficult for companies to generate much needed investment into the province's manufacturing sector, or to attract investment from outside Canada. It also creates a danger that mid-sized firms and others, particularly those with US head offices, will choose to take advantage of the opportunities presented by the TPP from places other than Ontario.

Joe Terrett, Editor

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).



COVER IMAGE: STEPHEN URAHNEY

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# PLANT

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» Bulletins

**CAE**, a Montreal-based developer of aerospace simulation and modelling technology, has been awarded contracts worth \$100 million for training services. Two contracts involved the US armed forces, which exercised an option for training services in the KC-135 Aircrew Training System program. The US Navy exercised a similar option for its T-44C aircrew training services program. And the German Air Force has signed a five-year maintenance and support services deal for Eurofighter trainers.

**Celestica**, the Toronto-based electronics manufacturer, has been named EMS Partner of the Year by **Cisco**. The award recognizes operational performance excellent and supply chain support. Celestica received the award at Cisco's annual supplier appreciation event in Santa Clara, Calif.

Xebec Adsorption (Shanghai) Co. Ltd., a subsidiary of Montreal's **Xebec Adsorption Inc.**, has received a \$3.3 million investment from Shanghai Chengyi New Energy Venture Capital Co. Ltd., converting the subsidiary into a sino-joint venture company. Xebec is a developer of gas purification and filtration solutions.

**G.W. Anglin Manufacturing Inc.** in Montreal has partnered with two venture capital firms to acquire Amtech, a commercial fleet upfitting business in Quebec. G.W. Anglin will retain Amtech's entire staff. Its CEO has been named president of G.W.'s Quebec operations.

**Saputo Inc.** has acquired Woolwich Dairy, an Orangeville, Ont.-based company with manufacturing facilities in Ontario, Quebec and Wisconsin, for \$80 million. Woolwich employs 90 people who produce and sell goat cheese across North America. Montreal-based Saputo said the transaction expands its presence in the North American specialty cheese category.

**BioAmber Inc.'s** Sarnia, Ont. facility has reached commercial scale production and is now shipping bio-succinic acid to customers. Its plant, a joint venture with Mitsui & Co., uses an innovative technique to produce succinic acid from sugar at a cost lower than oil-based production. The process also reduces greenhouse gas emissions.

## Clearpath Robotics unveils OTTO

High-tech manufacturer partners with GE Ventures as strategic investor

**KITCHENER, Ont.** — Clearpath Robotics has unveiled its first self-driving warehouse robot: OTTO, designed for intelligent heavy-load transport in industrial environments.

The robotics innovator based in Kitchener, Ont., has designed Otto for modern factories and warehouses that need to be reconfigurable, responsive, and efficient. It uses the technology popularized by the Google self-driving car to deliver efficient transport in increasingly congested operations.

The robot doesn't rely on external infrastructure for navigation so implementation is hassle-free and highly scalable. It transports 3,300-lb. loads at speeds up to 4.5 mph, while tracking along optimal paths and safely avoiding collisions.

Applications include moving pallets in a warehouse or cross-dock, and for kitting or assembly line delivery.

Clearpath has OTTO units deployed in five test facilities, the first of which belonging to collabora-



OTTO uses the same driverless technology as Google's autonomous cars.

PHOTO: CLEARPATH

tive partner GE.

GE Ventures has also become a strategic investor in the company.

## Queen's principal real father of space flight in 1861

**BURLINGTON, Ont.** — Those interested in the details of space flight believe the idea envisioned by Jules Verne was finally scientifically conceptualized during the lead-up to the twentieth century. But a space expert and author has revealed that is not the case, and credit actually goes to a man who was at one time principal of Queen's University in Kingston, Ont.

*The First Scientific Concept of Rockets for Space Travel* by space historian Robert Godwin, an author and editor of dozens of books on space flight, asserts a Presbyterian minister named William Leitch, born in Scotland in 1814, was the first trained scientist to have correctly applied modern scientific principles to space flight. Leitch articulated the concept in an essay, which he wrote in the summer of 1861, called *A Journey Through Space* — 30 years earlier than the accepted time the idea was

scientifically conceptualized.

Leitch's work was published in a journal in Edinburgh a year before being included in his 1862 book *God's Glory in the Heavens*.

Godwin notes previous histories of space flight maintain the first scientific concept for rocket-powered space travel was envisioned at the end of the 19th and the beginning of the 20th century by such men as Russian Konstantin Tsiolkovsky, and American Robert Goddard. Both claimed Jules Verne as their inspiration. But Godwin says Leitch made his suggestion to use rockets four years before even Jules Verne's famous "space gun."

His paper reveals Leitch studied at the University of Glasgow in the same classroom as William Thomson, the legendary Lord Kelvin, and even assisted Kelvin in an experiment on electricity.

In 1859 Leitch was appointed to the post of Principal of Queen's University. He died in Canada in 1864 and is buried near the grave of Canada's first Prime Minister, Sir John A. Macdonald, who Godwin says he evidently knew.

"The fact we know that Leitch was a scientist is the key to this story," says Godwin. "He understood Newton's law of action and reaction, and predicted that a rocket would work more efficiently in the vacuum of space; a fact that still caused Goddard to be ridiculed six decades later."

Dave Williams, retired Canadian astronaut and former director of the Space and Life Sciences Directorate at the Johnson Space Centre, called Godwin's paper an impressive piece of research, noting the Leitch principles of spaceflight were "postulated and articulated so far before aerodynamic flight, let alone spaceflight."

## PLANT Off-Site photo feature RETURNS!

Travel with PLANT Magazine to an exotic locale and win \$75

**PLANT** is reviving its popular Off-Site photo feature.

When you go on a business trip or vacation, be sure to take a copy of **PLANT** with you. If you have a photo taken while reading your favourite manufacturing publication in a remote, interesting or exotic location and we use it, you'll get \$75.

**PLANT** has travelled all over the world, visiting such exotic locales as China's Great Wall, and Rome's Coliseum, it has been underwater and was taken on safari. Get snapping and become a **PLANT** celebrity!

Send photos with name, title, company, address and phone number to Off-Site, **PLANT**, jterrett@plant.ca. Digital photos should be at least 5x7 inches and 300 dpi.



Gone fishing and taking a break with **PLANT** Magazine.

## RBC cites top start-up barriers

**TORONTO** — More than half of Canadians are entrepreneurs at heart and have thought of owning their own business, according to a recent RBC Small Business survey. But it identified a number of challenges holding them back.

While 36% of Canadians who have thought of owning a business have actually started one, 84% of those who have not started a business say they would rather work for themselves than for someone else.

Top barriers were no capital/start-up money (44%), need steady/reliable income (38%), fear of failure (29%), and did not know how to start (28%).

While 67% of Millennials (age 18-34) have thought of owning their own business, 78% had not started. In addition to lack of capital, 34% said not knowing how to start and 23% identified too much debt as factors holding them back.

Of those who started their own businesses, 40% saved their own money; 35% started small or with a side business to test the waters; 28% got moral or financial support from family/friends; and 21% contacted a financial institution/accountant/lawyer.

## Ten Ont. startups headed to China

**TORONTO** — Ten Ontario startups have been selected to participate in a first-to-market incubator for investment-ready companies seeking a presence in China.

The companies will become part of the China Angels Mentorship Program (CAMP), which matches Ontario companies with Chinese investors, potential partners and mentors, as well as a small group of Canadian mentors who will work with them in Toronto and Beijing.

The partnership between Ontario Centres of Excellence (OCE) and CCAA will educate and prepare the companies and help shape their business models to fit the Chinese market.

The 10 companies selected for CAMP are: ApplyBoard, Beagle, Clausehound, Colibri Technologies, Eve Medical, KA Imaging, Reforges, Raise Your Flag, Story Values and Travelabulous.

They'll spend the next year building relationships in Ontario and China. The companies will travel to China for two weeks in November to work with their Chinese investors and Canadian mentors.

## Bombardier tallies \$369M CRJ deal

Firm order includes eight aircraft, option for six more

**MONTRÉAL** — Dublin-based CityJet will begin operating Bombardier's CRJ aircraft after the regional airline acquired the planes from another customer of the Montreal-based aerospace manufacturer.

The deal, worth \$369 million, includes eight CRJ900 aircraft, with an option for six additional planes that would bring the deal's total value to \$651 million.

CityJet will acquire the planes and lease them to Sweden's Scandanavian Airlines (SAS), part of a new collaboration between the two airlines on regional jet services.



Bombardier's CRJ900 jet.

PHOTO: BOMBARDIER

## Magna acquires UK body-in-white supplier

Stadco will be integrated into the Cosma stamping business

**AURORA, Ont.** — Magna International Inc. has acquired Stadco Automotive Ltd., an independent Tier 1 Body-In-White supplier based in the UK. It supplies steel and aluminum stampings and vehicle assemblies to Jaguar Land Rover, Ford Motor Co. and General Motors Co.

Stadco, which will be integrated into Magna's Cosma Int. stamping business, has four manufacturing facilities in the UK and one in Germany. They employ approximately 1,400 people.

Financial details were not provided.

Cosma manufactures a range of body, chassis and engineering solutions to OEM customers.

Aurora, Ont.-based Magna also announced it has received the Best Product Development Perfor-



Stadco employs 1,400 people at five plants in the UK and Germany.

PHOTO: MAGNA

mance Award from India-based automaker Mahindra Ltd. for the design and development of a ladder frame used on its Scorpio SUV.

## McMaster introduces new research chair

University will work to advance manufacturing and policy discussion

**HAMILTON** — Manufacturing Month began with an important announcement from McMaster University: Dr. Greig Mordue has been appointed to the ArcelorMittal Dofasco Chair in Advanced Manufacturing.

ArcelorMittal Dofasco, a large producer of flat carbon steel and part of the world's largest steel and mining company, announced it was establishing the research chair at the Hamilton University in 2012, as a legacy investment marking the company's 100th anniversary.

Mordue, previously general manager of Toyota Motor Manufacturing Canada (TMMC) responsible for corporate planning and external affairs, has covered a range of responsibilities involv-



Dr. Greig Mordue.

PHOTO: MCMMASTER

ing government relations, human resources and strategic planning.

He has worked with the Ontario government as a special assistant in a variety of departments, holds

a number of degrees from Canadian universities, and a couple from Scotland, including a PhD in Management from the University of Strathclyde in Glasgow.

Mordue, who assumed his post on July 1, is also associate professor, jointly appointed with the Department of Economics in the Faculty of Social Sciences and the Walter G. Booth School of Engineering Practice in the Faculty of Engineering at McMaster University.

"This Chair was an outcome of a Manufacturing Summit that we hosted in conjunction with the Conference Board of Canada," said Sean Donnelly, president and CEO, ArcelorMittal Dofasco.

He said having the chair at McMaster, a research intensive university, will enhance the profile of manufacturing in Canada and will be a strong contributor to the manufacturing public policy dialogue with all levels of government.

"Ultimately, our desire is to ensure Canadian manufacturers are well-positioned to improve their competitiveness, boost productivity and attract foreign direct investment," said Donnelly.

## Teledyne lands space deal

**WATERLOO, Ont.** — Teledyne DALSA is partnering with South-African satellite systems provider Denel Spaceteq to develop a multi-spectral image sensor for an advanced earth observation application that will return high resolution images by 2019.

The project will contribute to the ARMC (African Resource Management Constellation) forged between Algeria, Nigeria, Kenya and South Africa.

The images will provide data for applications in agriculture, crop and forestry management, urban planning, environment and disaster monitoring.

Teledyne DALSA is a developer of digital imaging and semiconductors headquartered in Waterloo, Ont. The company has more than 1,000 employees.

## » Careers



Neil Bruce



Chester Collier



Alan Kunce

SNC-Lavalin, the Montreal-based engineering and construction firm, has appointed **Neil Bruce** president and CEO. He succeeds **Robert Card**. Bruce joined the company in 2013 and was most recently COO.

Walter Surface Technologies, a surface treatment technologies company based in Montreal, has appointed **Chester Collier** senior vice-president and general manager of the company's Bio-Circle North America division. Collier began his career at Walter 35 years ago in sales and most recently was senior vice-president of Walter Canada and senior vice-president of global distribution.

UniCarriers Americas (UCA), a manufacturer of materials handling equipment, adds **Alan Kunce** to its team as national sales manager, part of the company's expansion in Canada. Kunce is responsible for national accounts and dealer development across Canada. He was previously employed by Hewitt Material Handling.

**Todd Stone** has joined Rotovac Group of Milton, Ont. as the vice-president of business development. He'll be leading all new product and design work for the manufacturer of custom thermoformed and rotationally moulded plastic components.

Catalyst Paper has appointed **Walter Tarnowsky** vice-president and general manager of the company's Port Alberni mill. He joined Catalyst in 2000 and most recently, he was Catalyst's director of paper mill productivity.

**Ken Wallewein** succeeds **Don White** as president of Apex Distribution Inc. White, one of Apex's original founders, is retiring. Wallewein joined Apex in 2004 as the Estevan branch general manager, was promoted to regional general manager Saskatchewan and most recently was appointed president of Apex Western Fiberglass.

BSM Technologies Inc., a provider of telematics based in Toronto has appointed **Peter Callaghan** chief sales officer. Callaghan was previously senior vice-president of sales and marketing at Webtech Wireless Inc.

Genuine Parts Co. has appointed **Alain Masse** president of UAP Inc., a wholly owned subsidiary in Montreal that distributes and remanufactures auto parts and replacement accessories. Masse joined UAP in 2011, and at the end of 2014 he took over the leadership of all corporate functions for the auto parts and heavy vehicle parts divisions.

Toronto-based electronics manufacturer Celestica Inc. has named **Jack Lawless** executive vice-president of diversified markets. He has 25 years experience across a variety of industries, including the aerospace and defence, industrial and semiconductor market segments. He will drive Celestica's growth in the aerospace and defence, energy, industrial and healthcare businesses.

## ThyssenKrupp shuttering Toronto plant

**TORONTO** — ThyssenKrupp Elevator Americas is closing its Toronto manufacturing operations and will consolidate the facility's production at its Middleton, Tenn. operation by mid-2016, resulting in the loss of 165 jobs.

The global elevator manufacturer said the closure is part of a broad plan to meet customer demand and manage marketplace challenges more effectively.

It will continue to employ more than 1,600 people elsewhere in Canada. Another 2,750 people work for ThyssenKrupp companies across the country.

## Velan cutting 110 Quebec jobs

**MONTREAL**—Industrial valve-maker Velan Inc. is cutting 110 workers and consolidating production into one of its two Montreal plants.

The company says the economic downturn, specifically in the energy sector, has created uncertainty that has hit its order books.

“The layoffs were necessary as the result of an economic downturn that is impacting some of our important markets, especially the energy markets where the falling price of oil and the state of the global economy are creating uncertainty and affecting our bookings,” said Yves Leduc, president of Velan.

The employee reduction will come through a combination of temporary layoffs and elimination of some positions in Velan’s North American facilities.

Approximately half of the employees being released are in unionized jobs and the other half are management and staff.

About 75% are in Montreal, 20% in Granby, Que. and the remainder in Williston, Vt. The move represents a 5% reduction of Velan’s global workforce.

The production transfer from the Ward Avenue building will be phased in over a period of nine to 12 months.

The cost of the transfer and layoffs will be about US\$2.5 million.

Velan, based in Montreal, recorded revenues of US\$456 million in 2014. It has manufacturing plants in 10 countries.

## ArcelorMittal invests \$27M in Longueuil Bar Mill

Finishing line upgrade will boost annual capacity by 500,000 tonnes

**LONGUEUIL, Que.** — ArcelorMittal Montreal is looking to strengthen its position as a local steel producer through a \$27 million investment in its Longueuil Bar Mill.

The project will update the finishing line and boost capacity by 500,000 tonnes per year.

“Approval of this investment is a mark of ArcelorMittal senior management’s confidence in our business unit,” said Sujit Sanyal, ArcelorMittal Montreal vice-president of operations.



Round steel bars manufactured at the Longueuil bar mill. PHOTO: ARCELLORMITTAL

The project is to be completed in 2017 and will consolidate 200 jobs at the plant.

Funding for the project will come from its parent’s global capital expenditure fund for strategic projects at its best-performing facilities.

The bar mill last underwent upgrades in 2013 when a new reheat furnace was installed, a project that improved performance while reducing energy consumption and greenhouse gas emissions.

## Magellan delivers radar modules

Will house electronics for MDA contract

**TORONTO** — Magellan Aerospace has delivered the structure for the first two payload modules to MacDonald, Dettwiler and Associates Ltd. (MDA) for Canada’s RADAR-SAT Constellation Mission.

The payload modules, built at Magellan’s Winnipeg facility, are major structural assemblies that will house the electronics for MDA’s radar payload.

The first module was delivered to MDA last fall and the second in late spring.

The Canadian Space Agency missions will provide 24-hour-a-day C-band synthetic aperture radar (SAR) data to augment and extend data upon which RADARSAT-2 users rely.

The modules provide mechanical support for the payload and align the electronics and SAR antennas. They also provide radiation shielding, thermal control for the electronics and mounting for the bus instruments.

Magellan’s aerospace division has also been awarded a contract to provide nose and main landing gear components, plus kitted assemblies to Messier-Bugatti-Dowty, extending a US\$80 million program through 2021.

## \$265M gas engine plant coming to Canada

GE Power cites access to EDC for the move from Wisconsin

**FAIRFIELD, Conn.** — In a rare case of plant investment location turnaround, GE Power & Water plans to stop manufacturing gas engines in Waukesha, Wis. and open a new \$265 million plant in Canada.

The global, industrial company is attributing the move that will put about 350 Wisconsin workers out of jobs to its need for access to Export Development Canada (EDC), the country’s export credit agency, but more pointedly, to the absence of an export credit agency (ECA) in the US.

General Electric Co. currently employs 350 at its manufacturing facility in Waukesha, building gas engines for compression, mechanical drive and power generation applications. It has notified employees about

the change and more than 400 US suppliers that generate almost \$47 million in revenue from the plant.

The company hasn’t revealed where the flexible production facility will be located, but it said the state-of-the-art “Brilliant Factory” in Canada will optimize efficiency and streamline production using data, analytics and software. The factory is to be completed in 20 months and will expand over time, also supporting manufacturing requirements for other GE businesses. And it will have back-up capacity to manufacture diesel engine components for GE Transportation.

GE cited its strong relationship with EDC, which is expected to expand in support of its Power & Water, Oil &

Gas and Transportation businesses. The company is currently bidding on \$11 billion of projects that require export financing.

It also noted in a press release more than 60 other countries have export credit agencies (ECA) that support domestic manufacturing for export, while the US “remains the only major economy in the world without an export bank.”

The authorization for the US export credit agency – the Export-Import Bank, or Ex-Im – lapsed on July 1. GE said for the last year, exporters and suppliers have called upon Congress to reauthorize the US Export-Import Bank to support manufacturing jobs “and level the playing field for US companies that compete globally.”

# Have You Heard?

Everyday, thousands of Canadian manufacturers are connecting through **EMC** ... to skills and training, vital programs and resources, and **EACH OTHER**

CMN  
ENERGY  
MANUFACTURING ESSENTIALS  
PEER TO PEER NETWORKING  
LMI RESOURCES  
TRAINING & COACHING  
FOOD & BEVERAGE  
HEALTH & SAFETY  
EMC DIRECT  
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RISK MANAGEMENT

Find out what you're missing!

Join the conversation

[www.emccanada.org/connect](http://www.emccanada.org/connect)

## Canfor buys Anthony Forest

**VANCOUVER** — Canfor Corp. is buying Anthony Forest Products Co. in El Dorado, Ark. for US\$93.5 million.

The deal includes approximately \$15 million of working capital.

AFP operates six facilities producing lumber, engineered wood and wood chips with a combined capacity of 250 million board feet (mmbf) equivalent.

A sawmill in Urbana, Ark. produces premium Southern pine lumber and has an operational capacity of 150 mmbf per year.

The company also owns laminating facilities in El Dorado, Ark. and Washington, Ga. The plants produce beams, columns and other glulam products with an annual combined capacity of 75 mmbf.

Chip mills in Louisiana and Texas have a total annual capacity of 800,000 tons.

AFP also owns a 50% interest in Anthony EACOM Inc., a joint venture with EACOM Timber Corp., located in Sault Ste. Marie, Ont., which manufactures I-joists, with an annual capacity of 54 million lineal feet.

AFP’s trailing 12-month EBITDA through August 2015 was approximately \$16 million.

Canfor is an integrated forest products company based in Vancouver.

# The Truth About Compressed Air!

If you think compressed air is too expensive and noisy - read this. The facts will surprise you!

## Compare these Blowoffs

There are a variety of ways to blow the water from the bottles shown in the photo below, but which method is best? To decide, we ran a comparison test on the same application using four different blowoff methods: drilled pipe, flat air nozzles, Super Air Knife (each using compressed air as a power source), and a blower supplied air knife (using an electric motor as a power source). Each system consisted of two twelve inch long air knives. The following comparison proves that the EXAIR Super Air Knife is the best choice for your blowoff, cooling or drying application.

The goal for each of the blowoff choices was to use the least amount of air possible to get the job done (lowest energy and noise level). The compressed air pressure required was 60 PSIG which provided adequate velocity to blow the water off. The blower used had a ten horsepower motor and was a centrifugal type blower at 18,000 RPM. The table at the bottom of the page summarizes the overall performance. Since your actual part may have an odd configuration, holes or sharp edges, we took sound level measurements in free air (no impinging surface).

### Drilled Pipe



This common blowoff is very inexpensive and easy to make. For this test, we used (2) drilled pipes, each with (25) 1/16" diameter holes on 1/2" centers. As shown in the test results below, the drilled pipe performed poorly. The initial cost of the drilled pipe is overshadowed by its high energy use. The holes are easily blocked and the noise level is excessive - both of which violate OSHA requirements. Velocity across the entire length was very inconsistent with spikes of air and numerous dead spots.

### Blower Air Knife



The blower proved to be an expensive, noisy option. As noted below, the purchase price is high. Operating cost was considerably lower than the drilled pipe and flat air nozzle, but was comparable to EXAIR's Super Air Knife. The large blower with its two 3" (8cm) diameter hoses requires significant mounting space compared to the others. Noise level was high at 90 dBA. There was no option for cycling it on and off to conserve energy like the other blowoffs. Costly bearing and filter maintenance along with downtime were also negative factors.

### Flat Air Nozzles



As shown below, this inexpensive air nozzle was the worst performer. It is available in plastic, aluminum and stainless steel from several manufacturers. The flat air nozzle provides some entrainment, but suffers from many of the same problems as the drilled pipe. Operating cost and noise level are both high. Some manufacturers offer flat air nozzles where the holes can be blocked - an OSHA violation. Velocity was inconsistent with spikes of air.

### EXAIR Super Air Knife



The Super Air Knife did an exceptional job of removing the moisture on one pass due to the uniformity of the laminar airflow. The sound level was extremely low. For this application, energy use was slightly higher than the blower but can be less than the blower if cycling on and off is possible. Safe operation is not an issue since the Super Air Knife can not be dead-ended. Maintenance costs are low since there are no moving parts to wear out.

## Facts about Blowers

Energy conscious plants might think a blower to be a better choice due to its slightly lower electrical consumption compared to a compressor. In reality, a blower is an expensive capital expenditure that requires frequent downtime and costly maintenance of filters, belts and bearings.

Here are some important facts:

- Filters must be replaced every one to three months.
- Belts must be replaced every three to six months.
- Typical bearing replacement is at least once a year at a cost near \$1000.
- Blower bearings wear out quickly due to the high speeds (17-20,000 RPM) required to generate effective airflows.
- Poorly designed seals that allow dirt and moisture infiltration and environments above 125°F decrease the one year bearing life.
- Many bearings can not be replaced in the field, resulting in downtime to send the assembly back to the manufacturer.

Blowers take up a lot of space and often produce sound levels that exceed OSHA noise level exposure requirements. Air volume and velocity are often difficult to control since mechanical adjustments are required.

To discuss an application, contact:

EXAIR Corporation  
11510 Goldcoast Drive  
Cincinnati, Ohio 45249-1621  
(800) 903-9247  
Fax: (513) 671-3363  
email: [techhelp@exair.com](mailto:techhelp@exair.com)  
[www.exair.com/18/423a.htm](http://www.exair.com/18/423a.htm)



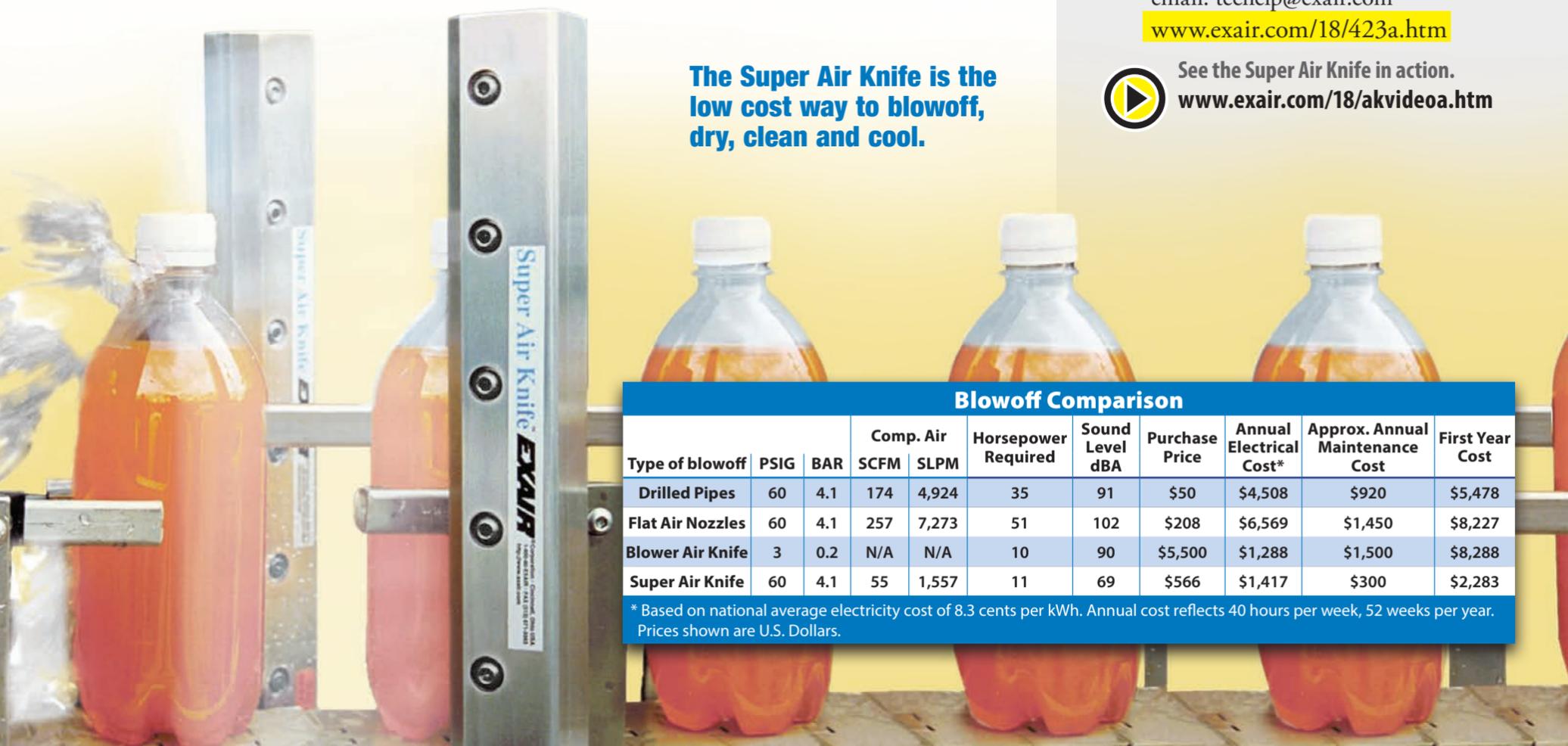
See the Super Air Knife in action.  
[www.exair.com/18/akvideoa.htm](http://www.exair.com/18/akvideoa.htm)

The Super Air Knife is the low cost way to blowoff, dry, clean and cool.

### Blowoff Comparison

Type of blowoff	PSIG	BAR	Comp. Air		Horsepower Required	Sound Level dBA	Purchase Price	Annual Electrical Cost*	Approx. Annual Maintenance Cost	First Year Cost
			SCFM	SLPM						
Drilled Pipes	60	4.1	174	4,924	35	91	\$50	\$4,508	\$920	\$5,478
Flat Air Nozzles	60	4.1	257	7,273	51	102	\$208	\$6,569	\$1,450	\$8,227
Blower Air Knife	3	0.2	N/A	N/A	10	90	\$5,500	\$1,288	\$1,500	\$8,288
Super Air Knife	60	4.1	55	1,557	11	69	\$566	\$1,417	\$300	\$2,283

\* Based on national average electricity cost of 8.3 cents per kWh. Annual cost reflects 40 hours per week, 52 weeks per year. Prices shown are U.S. Dollars.



## Ontario Chambers concerned over labour review

Suggested workplace changes would impact the province's competitiveness

**TORONTO** — The Ontario Chamber of Commerce (OCC) has called on the province to avoid proposals that would substantially affect competitiveness, jobs and the economy.

Responding to the Wynne government's *Changing Workplaces Review*, the OCC and more than 30 chambers of commerce and boards of trade have expressed their concern over previous deputations.

The OCC says many of those recommendations would result in significant changes to the Employments Standards Act and the Labour Relations Act, increasing the cost of doing business in Ontario, where employers already face mounting

costs as the result of a new mandatory pension plan, rising electricity rates and some of the highest workplace safety insurance premiums in the country.

Included in OCC's 14 recommendations are three key points.

The business groups urge caution concerning sector exemptions currently included in the ESA. It wants the exemptions, which it says often reflect the unique nature of certain sectors, to be maintained but some groups want them abolished.

Some groups are calling for provisions in the ESA that would require employers to post work schedules two weeks in advance. This is not feasible for all

sectors, says the OCC. It notes manufacturers must constantly adjust production in order to meet demand.

The OCC submission calls for a transparent process for union certification rules to be maintained. The government review is considering a proposal to allow Ontario workers to unionize by simply signing a union card, and removing the requirement for a secret vote.

Currently, the process to unionize involves an application demonstrating at least 40% support among workers followed by a supervised secret ballot vote, which the OCC says provides workers with the opportunity to make decisions "free of interference and external pressures."



Adding to the corporate tax burden. PHOTO: THINKSTOCK

## CME cautions against corporate tax hikes

**OTTAWA** — A report commissioned by Canadian Manufacturers & Exporters (CME) has found that a one percentage point increase in the corporate income tax rate would cut manufacturing profits by up to \$560 million and reduce annual business investment by up to \$7 billion.

Other casualties include dividend cuts totalling \$1.8 billion, the elimination of up to 75,000 manufacturing jobs and an overall net loss in GDP of \$4.1 billion.

The report emphasizes that corporate profits and the dividends they generate contribute to personal incomes, pensions and savings; higher after-tax rates of return on capital increase rates of business investment and economic growth; and higher profit margins that reduce Canada's unemployment rate and accelerate job growth.

Download copy of the report at [www.cme-mec.ca](http://www.cme-mec.ca).

## Liberal policies fuel Ontario's decline?

**TORONTO** — The roots of Ontario's decline from economic powerhouse to economic laggard can be found in a decade of failed government policies, says a new study by the Fraser Institute public policy think-tank.

*Ontario: No Longer a Place to Prosper* notes every year since 2003 Ontario has lagged Canada's economic growth, sending the unemployment rate above the national average for the first time, and per-capita incomes (in 2012).

The report blames the Liberal government for policies that impede economic recovery and hinder competition, citing, for example, a 50% minimum wage hike adding to the highest labour costs in Canada.

It also cites energy policy that has caused the cost of electricity to be the highest in Canada, and an upcoming mandatory provincial pension plan that promises less take-home pay for working Ontarians.

Successive Ontario governments are also called out for spending beyond their means, doubling Ontario's debt to \$287.3 billion in 2014. Ontario now spends \$11 billion per year on debt interest payments – almost 10 cents out of every revenue dollar.

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# PLANT PULSE

## ECONOMIC DEVELOPMENTS AND TRENDS

### BUSINESS SLOWS

Survey signals sharp deterioration in conditions

Overall business conditions deteriorated a bit more in September as output, new business and employment levels fell since August, according to the RBC Purchasing Managers' Index (PMI) for manufacturing.

Neutral at 50.0, the index registered 48.6 for the month, down from 49.4 in August, the lowest reading in the survey's five-year history.

It showed weaker demand leading to lower input buying and greater efforts to streamline inventories. Meanwhile, backlogs were reduced at the fastest pace since April.

Export sales were stagnating, despite the lower value of the loonie, while input prices increased, especially those coming from abroad, yet factory gate charges picked up only slightly.

Weakness during the month, centred mostly in Alberta and BC, was attributed to economic conditions, including renewed downward pressure on the price of oil. The rest of Canada's PMI levels registered above neutral and remained in expansion territory, said Craig Wright, senior vice-president and chief economist at RBC.

"Despite persisting challenges in the oil and gas sector, we expect the strengthening US economy to boost Canadian exports and business conditions over the balance of the year," he said.

September data indicated a decline in production volumes for the second consecutive month. The rate of contraction was moderate, but the fastest since March as manufacturers cut back production schedules in response to lower levels of new work.

Manufacturers noted a marginal fall in total new business, which ended a three-month period of expansion.

Employment was slightly weaker than in August, with respondents noting they weren't replacing voluntary departures.

The RBC PMI report is based on data compiled from monthly replies to questionnaires sent to purchasing executives in over 400 industrial companies. It's conducted in association with Markit, and the Supply Chain Management Association (SCMA).

The report is available at [www.rbc.com/news-room/pmi](http://www.rbc.com/news-room/pmi).



### TRADE OUT OF BALANCE

Canada's trade balance with the world narrowed in August as exports to the US declined by 3% to \$33.7 billion, and to \$10.2 billion or 5.5% to the rest of the world. Canada's surplus with the US declined from \$3.7 billion in July to \$2.9 billion; and the trade deficit beyond the US went from \$4.5 billion to \$5.4 billion. Imports were down 0.8% to \$30.8 billion from the US, but increased 2.2% to \$15.6 billion from the rest of the world.

Statistics Canada



Canada's ranking on latest Global Competitiveness list. The two-notch improvement is attributed to a lower budget deficit (2014). Company spending on R&D is ranked 26th and our capacity to innovate puts us at 23rd.

World Economic Forum



**40.8 MILLION**

Demand for electricity in Canada in megawatt hours during July, 2.9% lower than the previous year's total. Generation levels were down 0.9% to 46.3 million MWh, led by nuclear and steam conventional generation.

Statistics Canada

The confidence level of small businesses in September, which represents the fourth monthly decline, according to the CFIB's Business Barometer Index. That's roughly 10 points below what was recorded in the fall of 2014. Manufacturing confidence was trending higher at 58.7

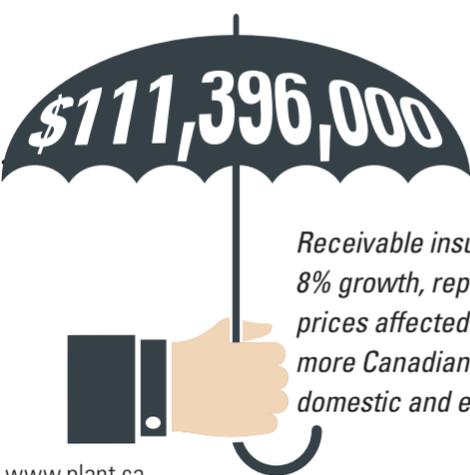
Canadian Federation of Independent Business



**42%**

Percentage of Canadian financial decision makers at mid-size firms who cite growth as their top priority for the next 12 months. Fifty-seven per cent are already seeing a rise in revenues compared to last year and 37% are looking to achieve growth by introducing new products or services to acquire new customers.

American Express



Receivable insurance premiums for the first half of the year (6,802 policies) represent 8% growth, reports the Receivables Insurance Association of Canada. With commodity prices affected by falling global growth and regional conflicts, the association says more Canadian companies are turning to insurance that protects their receivables from domestic and export customers who are unable to meet their obligations.

### BEPS ATTACKS TAX GAP

The Organisation for Economic Co-operation and Development (OECD) has developed a package of measures intended to reform international tax rules that will capture hundreds of billions of dollars in lost revenue.

The OECD/G20 Base Erosion and Profit Shifting (BEPS) Project shows governments how to close gaps in existing international rules that allow companies to make profits disappear or shift them to low or no-tax environments, where little or no economic activity takes place.

The loss of revenue is "conservatively" pegged at US\$100 billion to \$240 billion annually, or 4% to 10% of global corporate income tax revenues.

Measures include new minimum standards on: country-by-country reporting, which will provide a global view of multinational enterprises' operations; treaty shopping, to end the use of conduit companies to channel investments; curbing harmful tax practices; and effective mutual agreement procedures, to ensure the fight against double non-taxation does not result in double taxation.

The measures were to be discussed by G20 finance ministers at their meeting in Lima, Peru on Oct. 8.

» Disruptive Technologies

# To the STARS

## THOTH TECHNOLOGY AIMS TO ELEVATE SPACE EXPLORATION

The manufacturer of miniturized payloads has big ideas that could alter the trajectory of space exploration.

BY MATT POWELL, ASSOCIATE EDITOR

Some big things are happening in a small basement lab at York University's Petrie Science and Engineering building.

Behind the sealed doors of a clean testing room, accessible only if you're outfitted in a labcoat and hairnet, a huge steel tank snores away like an old man enjoying an afternoon nap in a La-Z-Boy recliner. The vessel is actually a thermal vacuum unit, but it looks more like a modernized iron lung. The instruments inside this super high-tech exploration equipment validation system will likely end up in space.

This is where Brendan (Ben) Quine and Caroline Roberts are working, alongside a team of graduate students and other researchers, to propel Canada's contributions to space exploration into the future, and where their company, Thoth Technology, calls home.

Thoth, named after the ancient Egyp-

tian god of wisdom (credited with introducing the Egyptians to mathematics, geometry, astronomy, land surveying, medicine, botany, reading, writing and oratory), is an OEM supplier of miniaturized payloads for space and UAV platforms. It develops award-winning infrared spectrometers and linescan cameras for CubeSat (miniturized satellite) missions, manufactured in Pembroke and Cookstown, Ont., with space flight validation performed at the York homebase.

But the company is best known of late for its space elevator, which would climb 20 kilometres into the atmosphere, and according to Quine, change the future of space flight and exploration forever, rendering all current rocket systems obsolete.

The name of Thoth's game is developing disruptive and transformative technologies that, as Quine puts it, "make a significant difference."

Founded in 2001 by the husband and wife team, Thoth is the product of some big thinking and a group of people determined to make their ideas happen. Their ultimate goal is to hitch a ride to Mars, landing Thoth's Beaver rover and Argus spectrometer on the red planet. It's a project, known as Northern Light, that they've been working on since 2006. They tried crowdfunding but the Indi-



eGogo campaign came up a little short. They're not giving up, though.

"Putting something on Mars isn't easy, but we haven't stopped working on Northern Light. It's going to happen," says Roberts, a native Newfoundlander and Rhodes Scholar who is the daughter of former provincial Lieutenant Governor and Order of Canada recipient, Ed Roberts.

Quine (born in the UK) and Roberts met while studying at Oxford University. He was an engineer, completing a doc-

torate on guidance control systems.

"I just thought that was the coolest topic," says Roberts, upon learning of Quine's studies. "I've been hooked ever since."

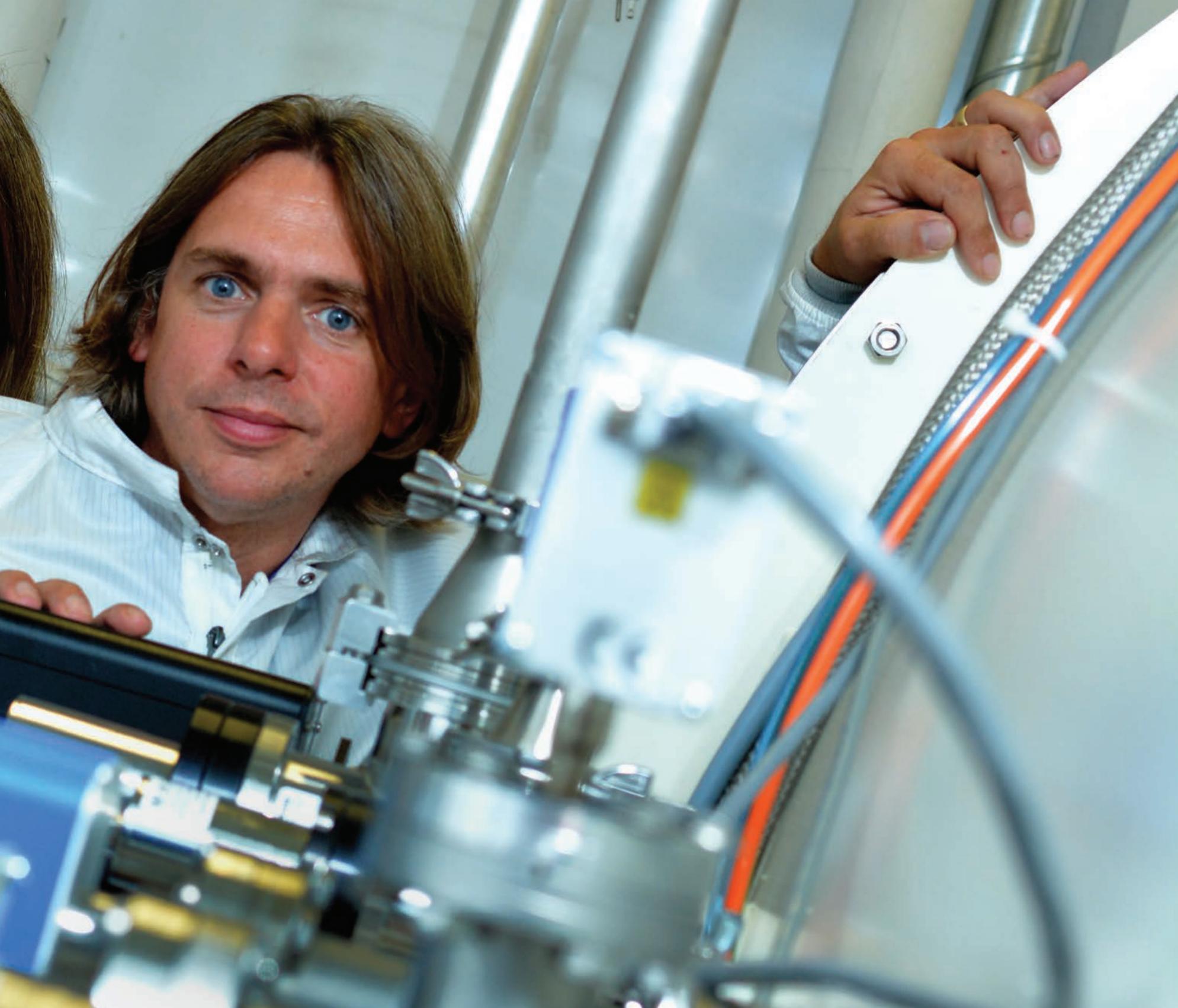
Quine previously worked for the European spacecraft manufacturer EADS Astrium Ltd., and is experienced with all phases of spacecraft design and manufacture. He worked on Astrium's cryogenic cooler program and on the development of navigation and propulsion systems for spacecraft. While at Oxford,



A component on board Thoth's thermal vacuum unit, which validates instrumentation for space flight.



The entrance to Thoth's space test facility at York University.



he developed an autoums star tracker for altitude determination and spacecraft navigation, which was launched on the PROBA European spacecraft.

He came to Canada in 1996, and began teaching in the University of Toronto's Department of Physics' Atmospheric Research Group as an assistant professor. In 2003, he made the 30-minute drive north to York University to lead the renewal of the school's Space Engineering Program and played a critical role in raising \$1 million to establish the space test

facility, which has also grown to play a crucial role in Thoth's business mix.

They've been a team since, founding Thoth in 2001. She is president and CEO, responsible for the commercial and proprietary interests of the company; he leads the technical team as chief technology officer. And they've got five full-time employees, plus 10 consultants turning ideas into reality.

Roberts says the company's main business is as a manufacturer, but it also has success and makes a fair portion of its

revenues providing end-to-end mission services for industry, academia and government departments and agencies.

The company's Argus IR spectrometers and Aurora IR linescan cameras with heritage electronics have low mass and power, and they operate out of the box. Thoth also provides Ibis flight computers and Beaver micro-rover systems ruggedized for harsh environments. The systems cover a range of terrestrial and space-based applications, including environmental monitoring, communications and process control.

*Thoth's husband and wife leadership, Caroline Roberts and Brendan Quine.* PHOTOS: STEPHEN UHRANEY

"If you look back to the gold rush, it wasn't the people going after the gold making the big money – it was the people selling them the shovels to dig it out," Quine explains. "We've found a nice niche in providing services to companies that want to test their instrumentation with our validation equipment."

It also helps Thoth manage market fluctuations and keeps the company busy whatever industry conditions.

"If there's a downturn in one part of the market, we can turn to another in related areas," says Quine.

The company's manufactured components are also qualified for space flight, some of which have actually made it into orbit, such as the Argus IR spectrometer. They're equipped with integrated optics for remote sensing applications, including environment monitoring and process control, operating in the near infrared band 1,000 to 1,700 nanometers (or up to 2,400 nanometers in the extended range version).

The Argus uses an InGaAs detector array of approximately 100 illuminated elements that is actively cooled. Flown in space, the ruggedized spectrometer

*Continued on page 12*



*Sinclair Interplanetary's Kofi Amankwah (left) and Thoth's Raj Jagpal perform a vibration test.*

### Reaching the stars

In addition to full mission services, Thoth offers spacecraft navigation and tracking services, spectrometers, electronics software and hardware, thermal vacuum systems, as well as atmospheric and optical simulation services.

"To qualify equipment for space flight, you have to test it, and together the procedures are called a "shake and bake." The instrument is shaken to know if it can withstand the forces of a rocket launch and then it is placed in our thermal vacuum chamber to create the vacuum of space and temperatures are cycled up and down to recreate thermal extremes," explains Roberts.

Why are the company's mission services efforts so lucrative?

# Innovation intensive

Continued from page 11

units have a mass of less than 220 grams, ideal for CubeSat missions.

It was also awarded the Allouette Award in 2010 for its contributions to the CanX-2 spacecraft mission, operating a pollution spectrometer in low Earth orbit to monitor greenhouse gas emissions with a spatial accuracy of 1.5 kilometres.

And there's the Aurora 1000 SWIR (Short Wave Infrared) line-scan camera, equipped with integrated optics for remote sensing. It has the same space-heritage electronics as the Argus spectrometers.

The camera also operates in the same infrared ranges and uses an InGaAs detector array of 256 elements that is actively cooled. It can be flown on UAVs or in space.

Quine and Roberts are big fans of the federal Scientific Research and Experimental Development (SR&ED) tax credit, which they say encourages high-tech Canadian companies to keep the innovation ball rolling.

"[SR&ED] is one of the best programs out there and a huge opportunity for smaller Canadian businesses to accomplish some big things," says Quine about the "after-the-fact" program, adding that it does a good job of being reactionary to market opportunities.

## Cross-market opportunities

Thoth's components are assembled as ready for space flight or not, and are manufactured at three facilities at York, in Cookstown, Ont., and at the Algonquin Radio Observatory, which the company acquired in 2008 when the Canadian government had plans to demolish the massive 46-metre antenna. The lease gives the telescope a 20-year stay of execution.

The giant antenna was the first to demonstrate Very Long Baseline Interferome-

try, which is used to measure continental drift and other geodetic data, and is used by Thoth to provide space-tracking and communications services for both near-Earth and interplanetary spacecraft.

Quine says Thoth is also exploring the UAV, or drone, market for the Argus and Aurora instruments. They provide infrared and heat signature services that could be used in applications such as power line inspection to detect failed isolators, or even geo-survey potential mine sites for particular minerals that have infrared characteristics.

"The UAV market is exploding, it's going to be huge and there's major opportunities for our technologies there," he says.

A piece of equipment such as Argus

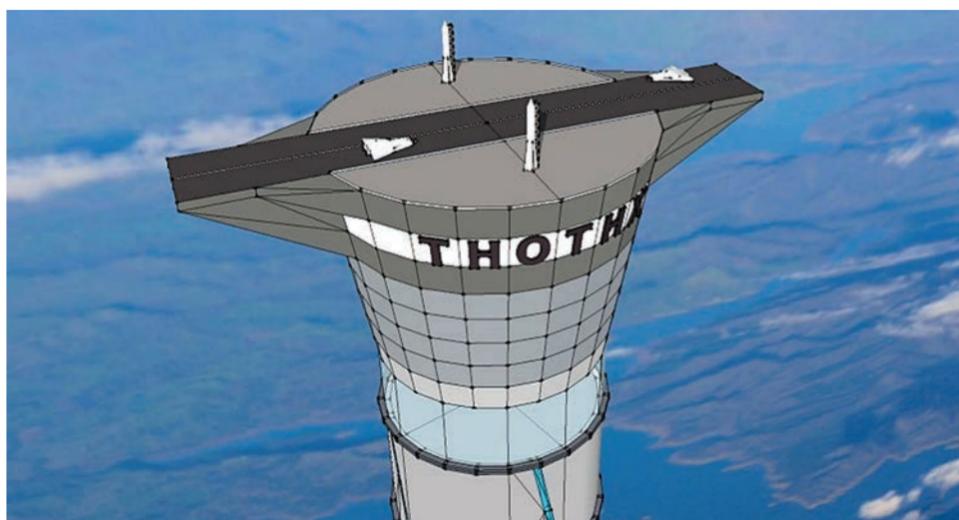
**"The space elevator could render all current rocket systems obsolete..."**

would even be useful for deployment by regions like Ontario, where efforts to reduce carbon dioxide emissions are underway, such as its cap and trade program. The spectrometers could be used onboard CubeSat missions to measure CO2 emissions from the upper atmosphere.

"That kind of capability would be important to validating a country's, or region's, emission standards protocols," he says.

Current target markets are China and India, where Roberts says both countries have long-term space exploration plans. India has landed a craft on Mars, and did so for less than \$40 million, which Quine says "would be less than the cost of one of the legs onboard an American vehicle."

"China launches more spacecraft than anyone else. They're building a space station that will deploy by 2020. They have



A CAD rendering of the ThothX Tower and platform.

PHOTO: THOTH

a number of long-term plans, and they're following through with them. That's a major opportunity for a company like ours."

While Quine and Roberts have built themselves a nice business with the manufacturing and validation services, it has all been leading up to an idea that's much bigger, and a whole lot taller.

## Redefining space exploration

Thoth has received US and UK patents for a 20-kilometre space elevator, which would stand more than 20 times higher than any other man-made structure. It would work as a launch platform that would enable reusable spacecraft to take off from a runway and reduce rocket fuel costs by more than 30%.

Quine's idea, which he and Roberts estimate would cost between \$5 billion to \$10 billion to build, is all about redefining the way spacecraft are sent into orbit, bringing more people to space and enhancing the research capabilities of space exploration equipment.

"Rocket launches are terribly inefficient," says Quine. "We can eliminate the entire vertical ascent phase of a spacecraft by launching it from something like the space elevator to reduce the amount of energy spacecrafts require and it enables those reusable vehicles being developed by (Elon Musk's) Space X, Darper and Boeing to utilize their technologies."

Astronauts would ascend by electrical elevator, and from the top of the tower, space planes would launch in a single stage to orbit, returning to the top of the tower for refueling and reflight.

"They would also be able to inspect their equipment and identify maintenance issues, which is something that isn't always easy to do," says Quine, referring to the two of three stages of a rocket that free-fall into the world's oceans once the spacecraft reaches orbit.

According to the patent documents, the tower would be comprised of a pneumatically pressurized structure formed from flexible sheet metal – stacked rings of Kevlar cells inflated with hydrogen or helium at an extremely high pressure.

The tower would withstand lightning, meteors and even category five hurricanes. The design includes gyroscopes to control the tower's movement and stabilize it during storms. The company hopes to build a 1.5-kilometre version within five years.

Quine also believes the space elevator would provide a platform for renewable energy sources such as wind to maximize its efficiency.

"Even at 14 kilometres, the wind is blowing strong enough that a wind turbine could produce energy 98% of the time. That's been the biggest issue with wind energy – it doesn't always produce energy. The space tower would make them five times as efficient – that's to the level of a nuclear reactor," says Quine.

"They also won't kill any birds and you're not going to hear them. So those are positives."

Thoth Technology may be a small company, but it has big ideas that could make space easier to access for those who would like to see Earth from a much higher vantage point, or just leave on futuristic missions to the unexplored realms of space.

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).

## Mission to the red planet

### Northern Light seeks out life on Mars

Quine and Roberts really want to land Thoth on Mars.

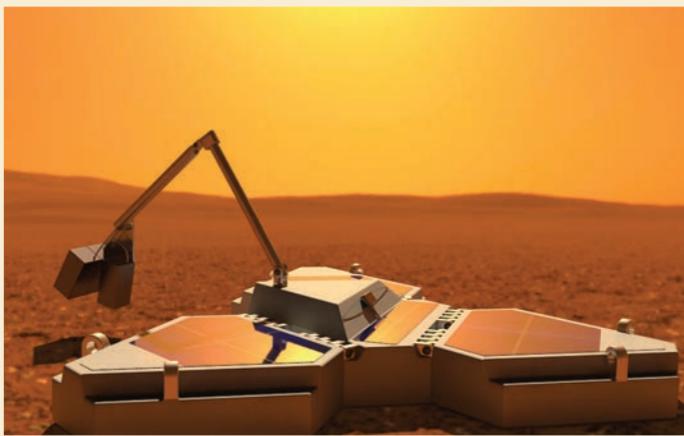
The Northern Light project aims to do just that with Thoth's Beaver rover and Argus spectrometer as part of a partnership between 12 Canadian universities, led by Quine, who is the principal investigator for the mission.

Their goal is to piggyback a ride to Mars by 2018, and last year started an IndieGogo crowdfunding campaign hoping to raise \$1.1 million to pay for the hardware needed to fly the Northern Light lander and Beaver rover in space and land them on Mars.

The project aims to gather data about rocks, minerals and greenhouse gases, and even search for life forms, such as photosynthetic microbes similar to those protected by ice and rock formations in Antarctica and the Canadian arctic. They're protected from UV rays but can still use sunlight to produce energy.

The Northern Light lander will look for similar light on Mars by using its robotic arm to grind away the surface of rocks. A device called a photometer would scan for different shades of green that may indicate the presence of photosynthetic organisms.

The solar-powered Beaver weighs just six kilograms and is semi-autonomous, much lighter than the nuclear-powered NASA Curiosity rover that weighed more than 900 kilograms, was controlled from Earth and



Thoth's Northern Light Mars lander.

PHOTO:THOTH

only covered a few dozen metres of travel per day (because the driver's commands took 15 minutes to reach Mars from Earth).

Quine has spend 12 years on the project, and his team has spent more than \$500,000 developing and testing prototypes of the lander and micro-rovers.

"Putting something on Mars isn't easy," he quips.

Roberts says Thoth is currently in talks with India's space agency to hitch a ride to Mars.

"We haven't stopped working on Northern Light. It's still a green light, go."

» Security

The digitization of the manufacturing supply chain has made manufacturers particularly susceptible to cyber breaches.

BY IMRAN AHMAD

Canada's manufacturers are developing innovative techniques, incorporating cutting edge technologies and investing heavily in R&D.

Given the digitization of all aspects of manufacturing, companies are high value targets for cyber criminals looking to steal critical intellectual property such as trade secrets, product designs, and customer lists that can be sold to the highest bidder half way around the world.

While the threat of a successful cyber-attack can't be eliminated entirely, the following will reduce the risk:

**Protect the "Crown Jewels."** Identify and properly secure all data that's critical to the business (such as trade secrets, intellectual property). This can be done in a variety of ways, including centralizing, tagging and encrypting data. Consider "airgapping" the most critical data by storing it in a system not connected to the internet that has robust credential authentication protocols. Have backups to recover lost or damaged data.

**Secure the supply chain.** Manufacturers depend on their supply chains, but this comes with risk if vendors, service providers and other third parties are given physical and/or digital access to the manufacturer's network.

Typical supply chain cyber security measures include: buying only from trusted vendors; disconnecting critical machines from outside networks; and educating users on threats and protective measures. Ensure service providers meet the security requirements (such as using "commercial grade" instead of free anti-malware software that's less frequently updated with critical patches).

**Practice good cyber hygiene.** Successful cyber attacks are often the result of insufficient employee awareness and training. For example, cyber criminals can gain access to a network by sending an employee an e-mail that appears to be from a trusted source. It asks the employee to log onto a bogus page that requests a user name and password or click on a link that will download spyware or other malicious programming.

Put practical and effective cyber policies in place and provide employees with regular training that helps them identify and correctly deal with potential threats. Businesses with high employee churn should conduct training more frequently.

**Have insurance.** It's a key part of risk management and offers significant protection from unplanned events. Consider investing in insurance that covers network breaches, data loss and potential litigation costs. That said, cyber-risk insurance may only cover a fraction of the cost related to an attack. That's why it's important to have sufficient financial resources to weather a cyber attack and



PHOTO: THINKSTOCK

## AVOID BECOMING A HIGH VALUE ONLINE TARGET

ensure business continuity.

**Build a cyber monitoring team.** It should consist of knowledgeable managers and professionals (internal and external) who will meet regularly to assess threat levels, discuss how to address gaps and make recommendations to management on how to protect digital assets.

Cyber criminals will seek out manufacturers as high value targets for the foreseeable future. Take reasonable steps to protect your digital assets.

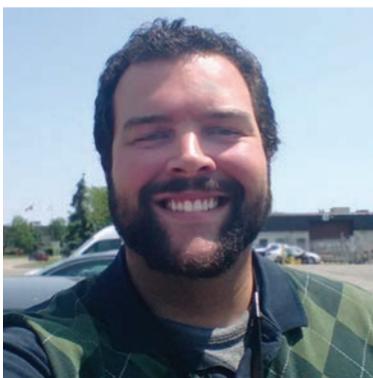
*Imran Ahmad is a lawyer at the Toronto law firm Cassels Brock & Blackwell LLP. Follow him on Twitter: @imranvpf or e-mail iahmad@casselsbrock.com.*

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).



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Acklands-Grainger  
Winnipeg, Manitoba

"We pulled off and delivered on a difficult request for our customer and as a result, we built a foundation of trust. And that's because team members were willing to cross roles."

Textbooks tell us that creating solutions takes ingenuity and careful planning. But in the real world, we all know it takes long hours, teamwork and a good dose of perseverance, too. Just new on the job, Josh Learn showed that he knew his stuff.

The challenges were formidable. A vague RFQ. A large number of SKUs. And a short timeline to respond. Sounds like it might be a tough contract to win, right? In this case, winning the contract was just the beginning for Josh. A remote site and a lack of onsite storage made the problem even trickier.

KeepStock™ Inventory Management  
Saving you time, money and space



Get the full story of how Josh solved this problem, as well as other examples of Acklands-Grainger team members finding solutions, by visiting:

[AcklandsGrainger.com/ProblemSolved/Josh](http://AcklandsGrainger.com/ProblemSolved/Josh)

### » Exporting

The FITT Training directory of exporter skills details the competencies needed for a person to be recognized as a competent international trade professional.

BY MARK DRAKE

Professional offices belonging to lawyers, doctors or dentists usually have plaques all over the walls indicating qualifications from universities, technical institutes and/or professional associations. This is intended to provide a large measure of confidence to the client, a patient lying captive on the examination table or the one in the dentist's chair.

When it comes to international trade practitioners, there may be an MBA qualification on the business card, but this gives little guarantee of expertise relevant to the tasks at hand. The Forum for International Trade Training ([www.fitt.ca](http://www.fitt.ca)) has taken a major step towards correcting this gap with the introduction of the Certified International Trade Professional (CITP) designation, but unless someone has actually taken or knows the FITTSkills program, there is little indication of specific competencies in this very wide field.

A remedy is at hand. FITT is well along the way to preparing a revised and updated directory of the skills needed for a person to be recognized as a competent international trade professional. This directory will enable practitioners to confirm their expertise, recruiters to check what potential candidates have to offer and senior executives to measure performance against defined criteria. Here are some of the essentials:



Know what it takes to be an international trade professional. PHOTO: THINKSTOCK

# Are you a TRADE PRO?

## SKILLS DIRECTORY SHOWS WHERE YOU FITT

**Feasibility.** As retailer Target recently discovered, the risks of entry into a foreign market (even a relatively benign one like Canada) are many. The market must be carefully chosen, and detailed market research conducted. Risks must be calculated, including commercial (will it be viable/profitable?), currency (which one to work in, and the risk mitigation required), economic (is the target market growing?), political (how stable is the country?), and what is the risk to technology and intellectual property?

Other questions to ask include:

- What's the risk to personnel serving abroad and the cost of keeping them in the particular market?
- Can profits be repatriated?
- How difficult is it to find local partners?
- In the event of a dispute in the mar-

ket what legal recourse is available?

- Are there enough funds available to commit to the venture?

In essence a detailed analysis of the situation should confirm whether or not the whole project is potentially feasible. To manage this is the first and most critical competence.

**Market entry.** There are many ways to tackle a new market, and each has varying degrees of risk. Using an agent or distributor is low risk, but limits control of the sales effort and sometimes knowledge of the market. Success is greatly dependent on selecting good partners and making them part of the team.

An alternative (depending on the type of product or service) is to sell direct with a locally recruited sales force. This is expensive to set up and manage but should provide a focused sales effort and

good feedback.

Licensing or some type of joint venture can offer an economical way of accessing the market in partnership with a trusted organization. This competence covers the ability to evaluate, cost out and ultimately managing the alternatives.

**Finance.** On the basis that "no sale is made until payment is received" financial competence is vital. Cash flow must be forecast and managed, payment methods (letters of credit, open account) determined, financing obtained if necessary, currencies assessed and perhaps hedged, insurance costed and arranged, and potential credit insurance checked out. Know the key points to consider.

**Sales and marketing.** The product or service may need to be changed for the foreign market, a brand well known domestically may need adaptation for promotion abroad and competitive threats should be assessed.

A pricing strategy will have to be set out – including the entry-level targets and longer-term goals. Export orientated documents will be needed for exporting and for quotations and purchase orders.

A system for return of goods may be needed, and/or follow-up service in the field, including the training of local partners. The set-up and management of e-commerce operations will also be part of the equation.

Finally, there is the question of promotion by sales visits, trade shows, advertisements, literature and technical manuals (which will have to be appropriate for the market and in the right language).

**Distribution.** Competencies here cover the cost and methods for shipping goods to the target market, including the carriers to be used, any special packaging or labelling required, potential use of containers or air freight, customs protocols and insurance.

Freight forwarders are experts in this field but the professional trader must know where to find them and the questions to ask.

**Cultural and ethical issues.** Success in many foreign markets, especially beyond so-called "western" ones, requires knowledge of and sympathy for the culture and business practices there. Some knowledge of the local language (or at least an ability to learn it) is also a significant competency. So too is knowledge of international business ethics and current corporate social responsibility standards and practices.

FITT's new directory will cover much more than what's outlined here, but at least the international trade professional will be judged by a clear set of criteria, and the plaque on the office wall will really mean something.

Mark Drake is former president of Electrovert Ltd. and the Canadian Exporters' Association. E-mail [corsley@videotron.ca](mailto:corsley@videotron.ca).

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).



Master a complex task by breaking it into pieces.

PHOTO: THINKSTOCK

learning a complex task much easier. Working out in advance what must be trained and what can be shown to a person makes the learning go faster while improving performance.

If you're seeing new team members struggling with complex tasks, break the job down into smaller bits, until you can identify the few areas that are technically difficult, and address them during training. Your team members will go into their new tasks ready to perform, helping you deliver exactly what you want on time and at the expected cost.

Hugh Alley is operations manager of Westcan Industries, an industrial pump services provider in Port Coquitlam, BC. Previously he was president of First Line Training Inc. Call (604) 866-1502 or e-mail [halley@westcan.com](mailto:halley@westcan.com). View his blog is at <http://firstlinetraining.ca/blog>.

### » Training

## Learning complex tasks

Break them up into smaller pieces

BY HUGH ALLEY

When people are learning how to instruct, one of the first questions is, "How do I deal with a big, complex task?" There are really two key points.

The first is neatly captured in a quote from Henry Ford. "Nothing is particularly hard if you divide it into small jobs." Training is the same way.

The second point is, only a few of the many small jobs are complex enough to need training.

Take, for example, quoting on relatively complex rebuild work that has many components and operations. When it's broken down into small tasks, there are really only four that require some careful judgment: estimating the hours to build up a part with the welding process; estimating how long it will take to do the reverse engineering; sourcing specific replacement parts; and assessing what fit tolerances are acceptable. Everything else is going through the steps, but there are a lot of them. If you miss one, it causes grief later in the process. Making sure you do everything you're supposed to is much easier to figure out than understanding what fits are appropriate.

For the trainer, this seems like an extra complication, but it makes

» Think Lean

Reflect on your current business model, review your value stream map and set the goals that will drive your budget.

This is the time of year when many manufacturers conduct their strategic planning and put together budgets, so here are some thought starters to get the ball rolling.

**SWOT.** It's always good to pause and reflect on the current business model. Typically many organizations conduct a SWOT (strengths, weaknesses, opportunities and threat) analysis.

**Value stream maps.** You should still have an active value stream map (VSM). Bring the team back together and do a review. Determine if some non-value added processes have snuck into your processes. Reassess critical metrics to see if you're improving or staying static.

Revisiting your map at least annually means not having to track certain metrics on a daily, weekly or monthly basis. Take the boss who eliminated the collection of scrap data and recording it in a database. He noted the number hadn't changed significantly in 10 years and with good visual management in place, it would quickly become evident a process had become corrupt. He was so right! Several hundred of labour hours were redirected to improvement.

**SEVEN STEPS OF HOSHIN KANRI**

1. Identify key business issues.
2. Establish measurable objectives that address these issues.
3. Define overall vision and goals.
4. Develop supporting strategies for pursuing the goals.
5. Determine the tactics and objectives that facilitate each strategy.
6. Implement performance measures for every business process.
7. Measure business fundamentals.

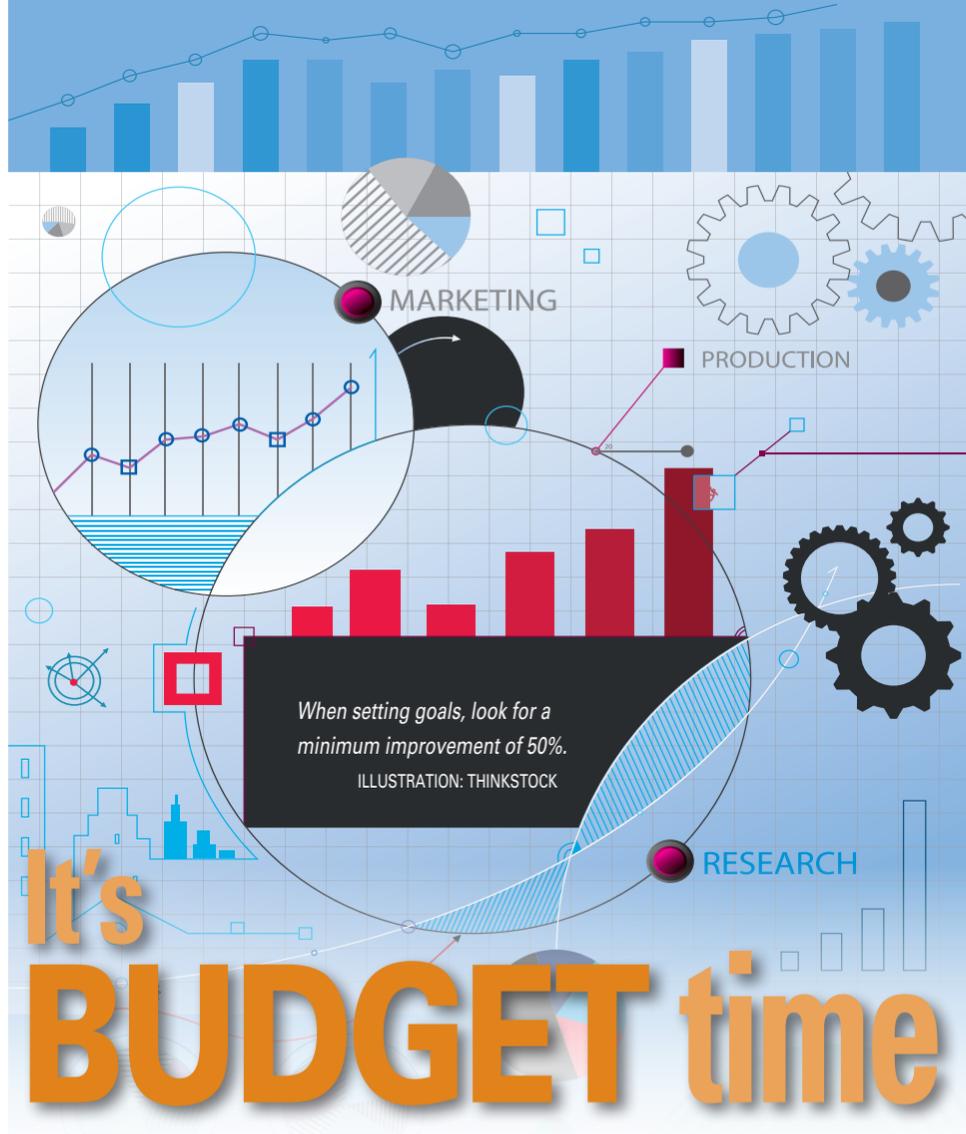
Source: Planning specialist Yoji Akao

**Big hairy audacious goal** (or BHAG, a strategic vision focusing on an audacious goal over the medium to long term). Never underestimate the power that lies within your organization. By looking at the opportunity list from your SWOT analysis and reflections from your VSM, establish BHAGs in many categories.

Don't attempt to engineer a solution during the meeting or to dismiss any idea as being impossible. Your team should have at least a year to work on the concepts.

When establishing your BHAG, look for a minimum improvement of a 50% in areas such as:

- Reducing process lead-time
- Set-up reduction



SOME THOUGHTS ABOUT PLANNING AHEAD

- Inventory reduction
- Part proliferation within a parent part
- Schedule re-refresh
- Start of shift to first production

Be sure to challenge your office processes.

**Execution.** Planning without action is a waste of time. Hoshin planning takes big ideas and makes them granular enough for everyone to get involved. (See sample infrastructure design "Strategic Systems" used by Kunst Solutions).

**Budgets.** Many manufacturers making their initial foray into lean with 5S, likely because the change to the facility is so dramatic. However, it will become just another housekeeping exercise without the proper training and you will not gain

any productivity improvements.

A proper 5S deployment (or workplace organization) needs to be planned before hitting the go button. Train your team on how they'll eliminate excessive steps to obtain tools and materials.

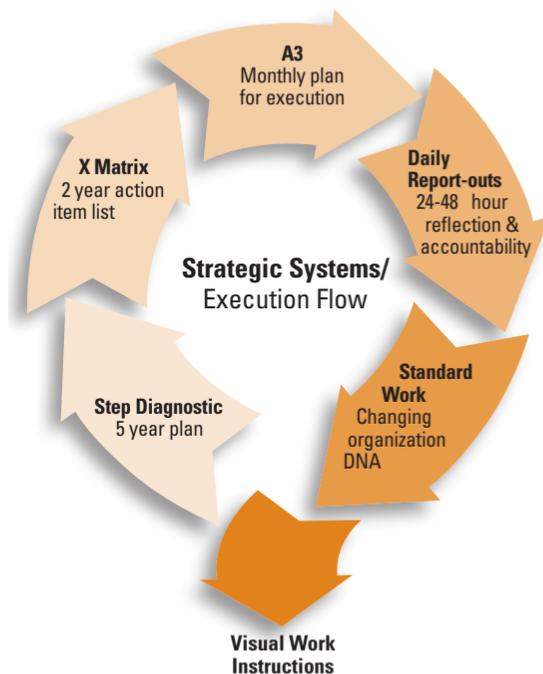
This initiative will create a new image for your organization, so it's very important to establish critical criteria for anything related to 5S, which includes colours, font type and styles, height of signage, etc. You want to empower employees and increase engagement, but within limits.

Here are some examples of some excellent 5S applications: a certified first aiders board; wall diagrams directly behind positions for items such as water and cardboard recycling; and a food contact and non-food contact utensil station.

When planning on organizing the workplace, budget from \$4 to \$16 per square foot, depending on how extreme you decide to go. Spend only what you can in a given year, and spread it out.

*Richard Kunst is president and CEO of Kunst Solutions Corp. Its Cambridge, Ont.-based facility supplies custom workplace organization solutions. Visit [www.kunstsolutions.com](http://www.kunstsolutions.com). E-mail [rkunst@kunstofsolutions.com](mailto:rkunst@kunstofsolutions.com).*

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).



Are you reducing waste in your processes but not seeing the savings yet? William Ritsch from Georgia Tech says unless you are able to reduce overtime, costs will likely remain static. Put freed up employee resources to work on additional value-adding activities to accommodate increased demand, which should lower your unit cost. Sales will help determine how to benefit from the increased capacity. He also notes reducing waste frees up "brain space" that can be used for forward thinking rather than putting out fires.

Source: Georgia Tech - Enterprise Innovation Institute (<http://gamep.org>)

» CCOHS Safety Tips  
Doing a stand-up job?  
How to relieve the ill effects on posture



Any prolonged position can hurt the body.

PHOTO: THINKSTOCK

Do some of the work in your plant require employees to stand in one position for hours on end? Physical discomforts include: sore feet, swelling of the legs, general muscular fatigue, low back pain, and stiffness in the neck and shoulders. But there are also a variety of health problems caused by degenerative damage to the tendons and ligaments.

Here are some tips for workers that will reduce the ill effects:

- **Workstation set up.** Adjust it using elbow height as the guide. For example, precision work requires a work surface that's five centimetres (cm) above elbow height; elbows should be supported. Lighter assembly line or mechanical jobs require 5 to 10 cm below elbow height. Heavy work, demanding downward forces needs 20 to 40 cm below elbow height.
- **Proper position.** Always face the work, keeping the body close. Ensure there's enough space to change position. A foot rail or portable footrest allows the worker to shift body weight to one or the other leg. Sitting is good, whenever possible or at least during frequent rest breaks. Avoid over-reaching behind or above the shoulder line, or beyond the point of comfort.
- **Comfortable footwear.** Choose CSA-approved footwear with the proper ratings for the hazards in the workplace. Shoes should be as wide as the wearer's feet, leaving room for the toes to move. Arch supports prevent flattening of the feet, and a heel with a firm grip prevents slipping. Lace-up shoes are best, because they allow tightening the instep and prevent slipping inside the footwear. Heels should not be flat and no higher than 5 cm. A shock-absorbing insole is advised when working on a metal or cement floor.
- **Proper standing surface.** Wood, cork or rubber-covered floors are preferable, but on hard floors use mats that are dense enough to cushion the feet – not too thick – and with slanted edges to prevent tripping.

*This article was provided by the Canadian Centre for Occupational Health and Safety (CCOHS). The not-for-profit federal corporation promotes the physical, psychosocial and mental health of Canadian workers by providing information, training, education and management systems. Visit [www.ccohs.ca](http://www.ccohs.ca).*



» Maintenance

# Seal INSTALLATION

## SEVEN STEPS TO PREVENT COSTLY FAILURES

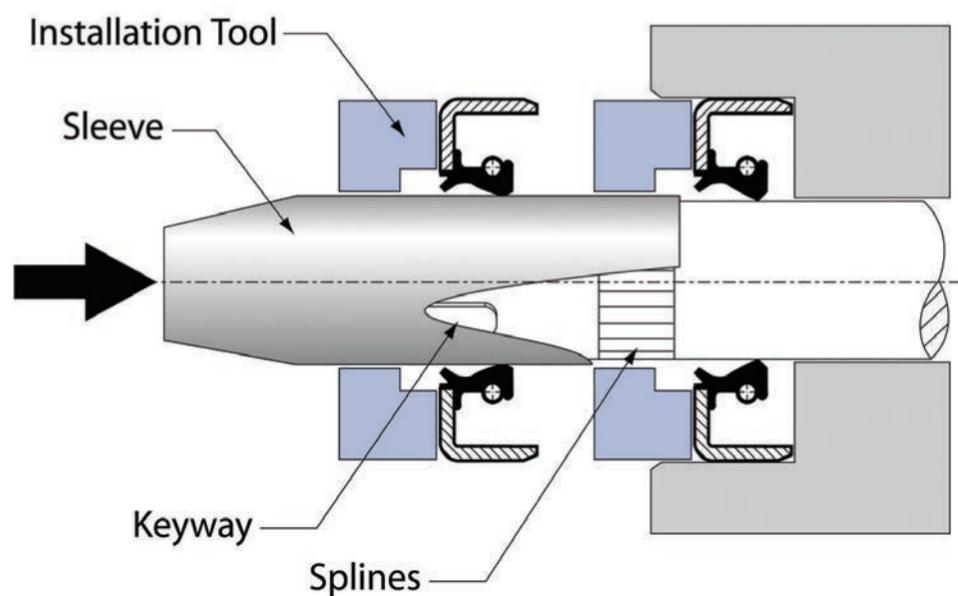
Small errors when installing seals can lead to premature failures, particularly in the field. Failures can be dramatically reduced or eliminated by following these seven steps, outlined in a White Paper on seal management by Daemar Canada, a supplier of components to the manufacturing and MRO markets.

**1.** Carefully inspect a new seal's lip to identify signs of damage or irregularities that will lead to leaks. The lip needs to be free of any nicks or tears and should not be folded back on itself. If a garter spring exists, locate it in the

related groove to ensure consistent contact with the shaft.

**2.** Inspect the housing bore and shaft that will interface with the seal. The bore and shaft should be free from burrs, grooves or scoring caused during operation when the old seal was in place. Use lead-in chamfers (get the specific dimensions from the seal supplier).

**3.** Avoid damage to the lip while aligning the seal with the shaft. Lubricate the lip and the shaft with a pre-lube that usually consists of the media that's being contained. The pre-lube allows the seal to slide easily on the shaft and prevents



Using an installation sleeve to install a seal.

ILLUSTRATION: DAEMAR

dry running conditions during the initial start-up.

**4.** To prevent leaks during start-up, orient the seal in the proper direction by noting the orientation of the old seal as it is removed. Generally, the lip will point to the side that contains the fluid to be retained.

**5.** Use a sleeve to protect the lip as it's installed over a shaft that has sharp keyways, splines and screw threads. Sleeves can be lubricated on the outside to avoid lip inversion.

**6.** Ensure the seal is properly aligned. Problems from misalignment include uneven lip wear, deformation that will cause the spring to pop out, and higher running temperatures between the shaft and lip that cause the lip to harden and crack. If the misalignment is severe, the lip will be unable to compensate and a leak will appear almost immediately after start-up.

**7.** The seal should be perpendicular to the shaft and the bore. An installation tool will apply the necessary force at the best location – usually around the outside diameter – and it can be designed to install the seal to the correct depth. Hydraulic or pneumatic presses will ensure the right pressure is applied. Arbors, mallets and strike plates are more common in the field. Pay attention to the consistency of the force applied around the seal's circumference.

A preventive maintenance program that includes all these procedures will keep equipment operating at an optimum level and reduce unscheduled maintenance expenses.

Daemar Canada has facilities in Toronto, Montreal and Edmonton. Visit <http://daemar.com>.

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).

### SHARE DATA ACROSS ZONES

Once business-system networks are segmented from plantwide networks using an industrial demilitarized zone (IDMZ), how is the data from industrial automation and control systems (IACS) securely shared? A white paper from Cisco and Rockwell Automation provides guidance for successful sharing by helping design and deploy the IDMZ. Visit <http://literature.rockwellautomation.com>, and search *Securely Traversing IACS Data Across the Industrial Demilitarized Zone*.



# TRENDING...

Cool gadgets, gear and the latest industry apps

### MAINTENANCE MADE EASIER IN THE CLOUD

Fluke Electronics Canada LP (based in Mississauga, Ont.) is making preventive maintenance easier, faster and more accurate with cloud-based, wireless Fluke Connect Assets ([www.flukeconnect.com](http://www.flukeconnect.com)) software and test tools. The phone app connects with test tools to provide a comprehensive view of all critical equipment, including baseline, historical, and current test tool measurement data, current status, and past inspection data. The software compares multiple measurement types in one system, making it easy to see correlations and spot problems. Concerned about an asset's health? Check the dashboard for health, analysis and status. And the info is shareable among maintenance teams via smartphones, from any location, using AutoRecord, or by video in real time with ShareLive.



### A SMART AND TOUGH PHONE

Need a smartphone that's also tough? The XP7 (touchscreen) and XP5 (without) from Sonim Technologies are designed for the toughest industrial conditions. The San Mateo, Calif. tech company claims they: resist dust, water, oil and chemicals, temperature, and extreme pressure; and withstand drops. You can use them while wearing gloves and they have extra-loud speakers plus noise cancellation to block plant racket. So far the XP5 is available to Bell users, and the XP7 to Bell and Telus users. (<http://www.sonimtech.com>)

### STREAMLINES PASSIVATION

Harness the mobility of a smart phone, the Internet of Things and a cloud-based app using SURFOX Smart Passivation Tester from Walter Surface Technologies in Montreal ([www.walter.com](http://www.walter.com)) to gauge the chemical reaction that makes stainless steel less vulnerable to corrosion. The app captures data and by applying telemetry, your technician analyzes changing chemical levels during the passivation process, mapping and tracking progress to determine when the piece is ready. Once a protective chromium oxide layer is formed, your stainless steel part is ready to face the environment.



### VISION WITH HIGH FRAME RATES

Genie Nano GigE Vision camera from Teledyne DALSA in Waterloo, Ont. packs a lot of capability into a smallish profile. It has CMOS image sensors, including the Sony Pregius and On Semiconductor's Python. TurboDrive technology delivers faster frame rates and the camera is feature rich: VGA to 12 MP; multi-window moving ROI; burst acquisition: 2 in/2 out optical couple I/O; and a -20 to 60 degree C operating temperature. ([www.teledynedalsa.com](http://www.teledynedalsa.com))

Once he reduced his energy costs by 55% after installing a VFD, savings in other parts of his business went into overdrive.

Once you start seeing the benefits from our incentives for installing premium efficiency motors and VFDs, you'll want to look into making other parts of your business like lighting, HVAC and compressed air systems more efficient too. When you do, you'll be joining thousands of organizations across Ontario who are already enjoying the savings that our programs deliver.

Take a look at their stories and our incentives at [saveonenergy.ca/business](https://saveonenergy.ca/business)



» Automotive

The trade partnership encompasses 40% of global GDP, but Canada's auto sector could be in for a bumpier ride from more foreign competition.

BY MATT POWELL, ASSOCIATE EDITOR

Canada and 11 partner countries have finalized in principle the Trans-Pacific Partnership (TPP), a massive trade deal that encompasses 40% of the world's GDP that opens new foreign markets for manufacturers. But it also presents new challenges for players in the automotive subsector.

It's not entirely clear what the impact will be on the automotive subsector, but Canadian manufacturers will have to deal with a reduced level of domestic content from NAFTA's 62.5% to just 45% per vehicle, and less for parts.

That's an improvement from 30% agreed to in a deal made in Hawaii between Japan and the US that left Canada and Mexico out of the discussion, but the new requirements amount to a 17.5% cut in domestic content and this raises concerns that foreign automakers won't invest in North American operations if they can source parts from cheaper TPP and non-TPP countries.

"The jury is out on what that really means in terms of costs to manufacturers, but [45%] is certainly better than some of the reports coming out about significantly lower requirements," said Mathew Wilson, vice-president of national policy at Canadian Manufacturers & Exporters (CME), which applauds the overall deal in principle.

The rules differ for auto parts, with the same 45% level for duty-free status but 40% for other components, such as engines, transmissions, chassis components, bumpers and suspensions. A third-set of parts can originate in TPP nations with 35% content.

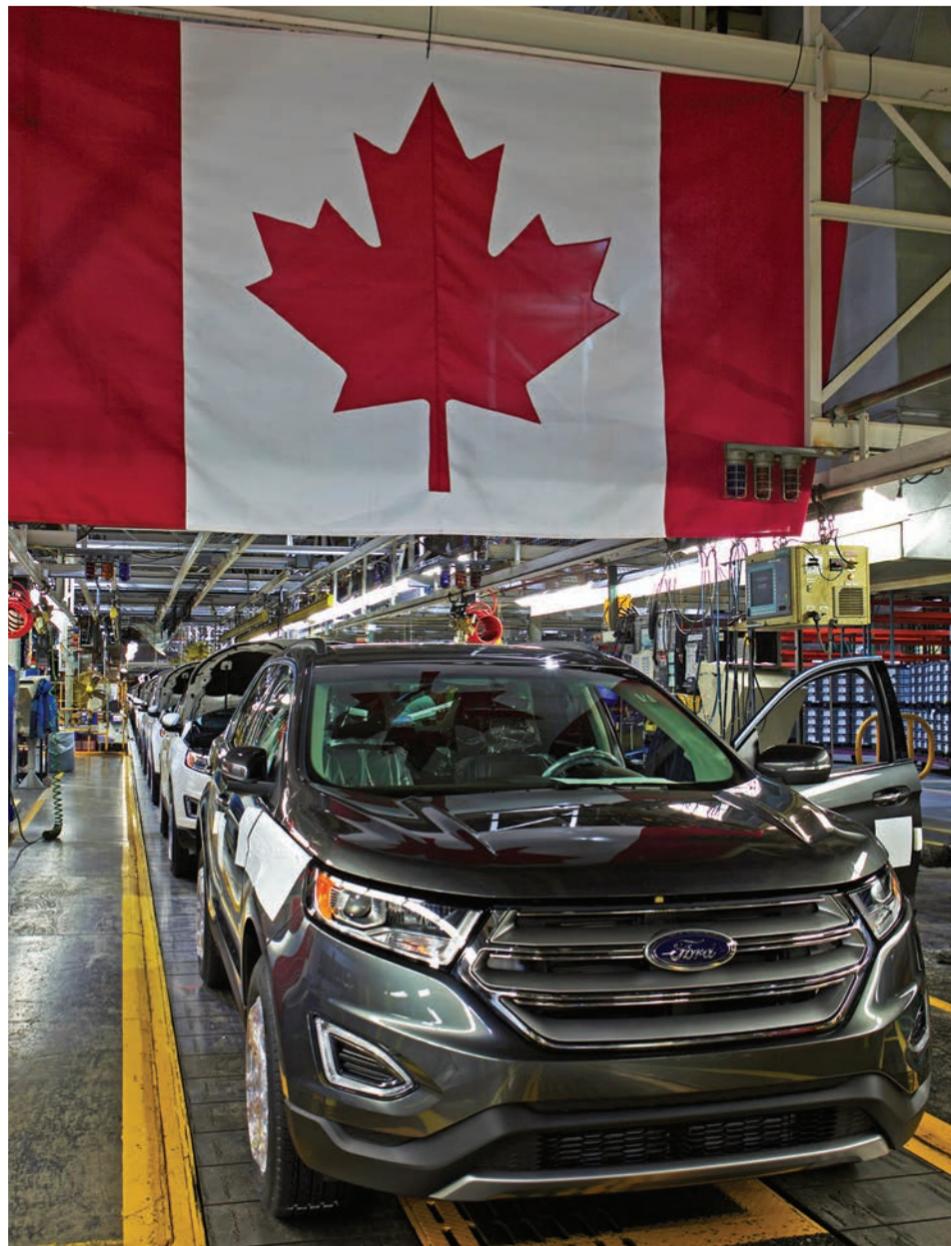
Unifor president Jerry Dias blasted the proposed agreement, a plan that he said will put an estimated 20,000 Canadian auto parts jobs at risk.

The union, which represents 40,000 auto workers, believes the deal could cut as much as one-fifth of the value-added content of a typical vehicle not just out of North America but out of the TPP zone.

"It is outrageous that the [Harper Conservatives] have signed a deal that would allow the majority of a car to be made in China, yet still come into Canada tariff-free," said Diaz.

Canada will also eliminate a 6.1% tariff on vehicles imported from Japan over the next five-years, while the Americans were able to expand the US deal to eliminate a 2.5% tariff on Japanese cars over 25 years.

The formula is complex and includes a series of exemptions, but Canada will eliminate its 6.1% tariff on import passenger cars from TPP countries through five annual, back-end loaded cuts once a final



Domestic content for vehicles has been reduced from 62.5% to 45%. PHOTO: FORD

6.1% tariff on cars and parts can be "snapped-back" to the original rate for up to 100 days.

Content rules have been a major component in the trade talks. The two-way negotiation between Japan and the US over the summer sparked an unlikely alliance between Canada's Automotive Parts Manufacturers' Association (APMA) and its counterpart, the Mexican National Automotive Parts Association (INA).

The associations estimate automotive manufacturing accounts for 20% of all trade and more than one million jobs across the three NAFTA markets.

Competitive disadvantage

In an August letter, APMA president Flavio Volpe and INA president Oscar Albin, wrote that the 30% domestic requirement proposed by Japanese negotiators "would allow countries such as Japan to use in their automotive supply an unreasonably high percentage of raw materials and components from non-TPP members... [this] would place our companies and workers in a competitively disadvantaged positioning in the North American market."

In a statement from the APMA following the deal's announcement, Volpe said, "small and medium-sized suppliers to Canada's vehicle assembly supply chain will face new competitive pressure from large, multinational firms from TPP countries and further abroad," and that the association will renew its "focus on ensuring the viability of all OEM assembly plants in Canada."

The federal government estimates TPP represents a market of nearly 800 million people and a combined GDP of \$28.5 trillion. The Asia-Pacific region is expected to represent two-thirds of the world's middle class and 50% of global GDP by 2050.

In an attempt to ease concerns, Prime Minister Stephen Harper announced the federal government would top up the Automotive Innovation Fund by \$1 billion over 10 years (\$100 million per year) to lure global auto parts manufacturers to Canada and provide an incentive to existing producers to invest in new equipment and modernize plants – an election promise that's contingent on a Conservative win.

Comments? E-mail [mpowell@plant.ca](mailto:mpowell@plant.ca).

# (Sort of a) DONE deal

## CANADA, 11 PARTNER NATIONS FINALIZE MASSIVE AGREEMENT

deal is signed.

The tariff elimination provision, however, has a snapback mechanism designed to protect Canada from a surge of Japanese imports, which Wilson believes is a positive.

"[The tariff snapback] gives our companies some protection based on the ability to export in similar qualities, specifically into Japan," he said.

In the event of non-compliance with TPP and bilateral obligations, Canada's

» Business

### A great place to operate But technology adoption needs work

Canada is among the top 10 globally dynamic countries. It ranks ninth among the 60 largest economies in the world based on 22 indicators across five growth areas: business operating environment, technology, labour market, market growth and financing environment, according to the Global Dynamism Index (GDI).

The global study conducted by the Economist Intelligence Unit for Grant Thornton, a global accounting and advisory firm, also ranks Canada first for its business operating environment. The category considers key indicators such as foreign trade, exchange regimes, controls and policy towards private enterprise and competition.

Some improvement is needed on promoting Canada as a choice busi-



ness destination that supports the growth of foreign companies, and technology adoption needs improvement (we rank 20th).

Globally, Singapore, Israel, Australia top the GDI. They provide the right mix of regulatory stability, a strong labour market, technological infrastructure, growth opportunities and access to finance.

## » Manufacturing

An Ivey Business School report points to growth in emerging markets and a more high-tech approach to products and processes as the path to success.

BY MATT POWELL, ASSOCIATE EDITOR

Although manufacturing may be down, it's certainly not out, but Canadian companies and policy makers are facing some complex and multi-faceted challenges.

That was the message at an early September meeting of the minds in Toronto, hosted by the University of Western Ontario's Ivey Business School, which included a panel of sector leaders and advocates. The discussion, moderated by Paul Boothe, director of the Lawrence National Centre for Policy and Management, included Robert Hardt, president and CEO of Siemens Canada, part of the global industrial products company; Linda Hasenfratz, CEO of Linamar Corp., a global auto parts manufacturer based in Guelph, Ont.; and Jayson Myers, president and CEO of CME.

The group discussed a number of strategies Canada's manufacturing sector must develop to improve its competitive advantage, which was also the focus of a research paper released in conjunction with the event. Authored by Boothe and released in partnership with Siemens Canada, *The Future of Canadian Manufacturing: Searching for Competitive Advantage*, offers a framework that outlines ways for companies to better position themselves in a more global, fast-paced and innovative marketplace driven by rapidly advancing technology and the growing importance of emerging markets.

"This is a call to action for all of us," said Hardt. "The window to create a new [manufacturing] structure is open and we must climb through it. [Canadian manufacturers] must move faster to capitalize on the global opportunities available to them."

Future sector trends will include growing demand in emerging markets, the changing nature of products and related services and a technology-driven revolution in the ways production processes are used to produce and market manufactured goods.

"Canadian manufacturers will need to recognize and stay ahead of these trends to win competitive advantage," writes Boothe.

He believes companies will be much better aligned to compete globally by identifying the people with whom they are interacting, by doing a better job of sourcing inputs and by better utilizing skills in R&D and innovation.

"Canada is the best country in the world to develop and manufacture state-of-the-art products [and we] process goods innovatively," said Hasenfratz. "We can be a platform to the world if we really want to be."

Automation will continue to transform manufacturing employment, the report says, a move that will transition manual production line work into knowledge-intensive, higher value-added jobs. Boothe believes the trend will be most apparent in industries such as chemicals, aerospace and automotive manufacturing, which rely on relatively advanced production techniques characterized by a high-level of R&D intensity and customization.

Myers agrees, suggesting that Canada's traditional manufacturing strengths won't be as evident as the indus-



PHOTO: THINKSTOCK

# Mapping Canada's FUTURE

## A FRAMEWORK FOR SUCCESS

try gets more high-tech and its workers more skilled with a particular technological prowess that derives from the country's stable foundation of innovation and research.

### Future trends

The report says the most obvious trend in the past decade is the growth of emerging economies – specifically China, India, Brazil, Indonesia and Mexico – not only as consumers of manufactured goods but also as competitors or collaborators in producing them. Boothe argues these external pressures require policy makers to ensure Canadian companies have access to customers in these key markets and for manufacturers to develop strategies for growing market share in these regions.

Another growing trend is the changing nature of manufactured products, specifically those growing in knowledge content and technological complexity.

### ECONOMIC IMPACT

Canada's manufacturing GDP is 11% below its level in 2000, and employment is just three quarters of what it was then, and there has been a loss of more than 500,000 jobs. Statistics Canada shows a 24% decline in manufacturing exports between 2000 and 2014 helped drive down overall exports by 6.4%. Yet manufacturing continues to be a key contributor to the economy. It accounts for:

- 61% of exports (2014)
- 10.6% of economic output
- 9.6% of the Canadian labour force

These factors and other activities including R&D, logistics, engineering, sales and marketing have a substantial multiplier effect on the national economy.

Paul Boothe, director of the Lawrence National Centre for Policy and Management, says these factors must continue to contribute to a reversal in the manufacturing's decline if Canada's economy is to prosper in the future.

"The pace of innovation has accelerated and innovation cycles are shorter, which is speeding up commercialization," said Myers. "And this trend is transforming business models and strategies. It's one Canadian manufacturers must be paying close attention to."

Production processes are also evolving, such as those powered by industrial software including the "Internet of Things," which improve product quality, operational consistency and efficiency, and lower production costs. Boothe noted as an example inter-machinery communication where computers will no longer simply control robotics but also integrate various aspects of the manufacturing supply chain.

"Companies that innovate and commercialize the fastest in today's environment are going to be the leaders. Manufacturers must realize that and capitalize on that opportunity," said Hardt.

Software will continue to play a greater role in the optimization of a product's entire lifecycle, which will likely result in manufacturers feeling greater pressure to shorten time to market and run product design concurrently with processes. And this is a good thing because the rise in software accessibility will provide new ways to tackle complexities while exploiting new efficiencies and eliminating waste.

### Bridging the education gap

The widespread application of these "connected" technologies will provide companies with a large amount of data and will also require people with the right

skills to see these changes through. The panellists agreed Canada is in a good position to make the most of a growing reliance on technology and its associated benefits. But Canada's education system must be better aligned with the needs of industry to develop the right people with the right skills.

"[Canada's] education system is great, it's world-class, but more must be done to move forward and we do that by collaborating with industry," said Hardt, who has spearheaded Siemens Canada's efforts to partner with colleges including Seneca in Toronto and Sheridan in Oakville, Ont.

The company has also provided a \$458 million product lifecycle management software grant to McMaster University in Hamilton, giving students the opportunity to use the same technologies in its design and manufacturing research programs that businesses around the world employ to produce some of the world's most sophisticated manufactured goods.

Linamar is educating young people about careers in manufacturing by sponsoring summer camps for grade 7 and 8 students in the Guelph, Ont.-area. The auto parts manufacturer also donated \$500,000 to Conestoga College in Cambridge, Ont. to provide scholarships for manufacturing engineering technology programs.

At Seneca and Sheridan, Siemens will provide guest lectures, technical workshops and curriculum development recommendations. Students will also have an opportunity to write a Siemens certification exam in mechatronic systems.

The report provides a good starting point for manufacturers. Canada has the technical prowess to address these changes, but manufacturers of all sizes must be willing to embrace them.

Download a copy of the Lawrence National Centre report at [www.ivey.uwo.ca](http://www.ivey.uwo.ca).

Comments? E-mail [mpowell@plant.ca](mailto:mpowell@plant.ca).

» Biofuels

The Montreal-based clean fuel developer prepares to flip the “on” switch at its Edmonton plant while exploring other opportunities.

BY PLANT STAFF

As the old saying goes, one man’s garbage is another man’s treasure.

This is the case for Montreal-based Enerkem Inc., a biofuel producer that turns non-recyclable city trash into bio-methanol with a proprietary chemical-based technology. And it’s now in expansion mode after raising \$152.6 million in financing from a \$29-million debt facility, \$50 million in placement from existing private investors and another \$73 million of debt from undisclosed lenders.

“We are about to fundamentally transform the waste industry over the coming years and allow energy and chemical groups access to a new and competitive source of renewable carbon,” said Vincent Chornet, Enerkem’s president and CEO.

# Cash injection for ENERKEM

## FUNDING WILL FUEL COMMERCIAL PRODUCTION



2016. The facility will produce enough biomethanol to fuel 400,000 cars with a 5% ethanol gasoline blend. Ethanol reduces GHG emissions from 48% to 68% compared to gasoline, according to Natural Resources Canada.

The project is expected to help the City of Edmonton increase its residential waste diversion rate to 90%.

### Opportunities abroad

Enerkem also has commercial-scale operations at a site in Westbury, Que., where it tests unconventional feedstocks and raw materials, develops new products and trains plant technicians and operators. The company also plans to build a new full-scale commercial facility in Varennes, Que.

The Westbury facility is a compact plant located in a rural area near a sawmill that recycles used electricity and telephone poles, and railway ties. Enerkem converts the non-usable portion of these poles, plus other waste materials into syngas, biomethanol and cellulosic ethanol.

Last year, the company signed two deals for the construction of garbage-to-biofuel plants in China. The MOU, signed by Yan Xiao Fei, chairman of Shanghai Environmental Group (a subsidiary of Shanghai Chengtong Holding Co. Ltd.) and Enerkem’s Chornet, was completed during a trade mission in China with Quebec premier Philippe Couillard.

Founded in 2000, the company employs 125 people.

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).

Enerkem raised \$152.6 million to transform the waste industry.

PHOTO: ENERKEM

The funding will help Enerkem initiate production at its commercial-scale bio-methanol production facility in Edmonton, which was completed last year and will eventually produce 38 million litres of fuel a year, but it will also help the company seek out opportunities in Europe and Asia, where cities and municipalities are running out of landfill space.

Construction of the Edmonton methanol-to-ethanol conversion unit is to be completed over the next year and production will begin in the second half of



**OUR DV SYSTEMS AIR COMPRESSOR IS POWERFUL, EFFICIENT & DEPENDABLE.**

**GLENN SINKE, OWNER & PRESIDENT, CAN AMERICAN STONE SPREADERS INC.**

When we asked **Glenn Sinke, Owner & President of Can American Stone Spreaders Ltd.**, an innovative manufacturer of stone spreaders in St. Catharines, Ontario, what he thought of their DV Systems rotary screw air compressor, he was pleased to say it’s extremely powerful, dependable and efficient, always allowing his team to deliver and meet the demands of his growing production workload.

**DVCOMPRESSORS.COM**



BUILT BETTER

» Construction

## Brampton Brick’s carbon play

### Concrete producer captures CO2 in blocks

An Ontario concrete block producer has committed to applying a carbon dioxide reduction technology developed on Canada’s East Coast that permanently captures CO2 waste.

Throughout this summer, the process developed by Halifax-based CarbonCure Technologies was adopted across Brampton Brick’s entire concrete masonry production.

The retrofit technology for concrete producers and builders reuses waste carbon dioxide during the concrete production process and contributes to green building certifications such as LEED.

CarbonCure recently closed a \$3 million Series C investment round (led by Vancouver-based Pangaea Ventures) to accelerate sales in the concrete masonry sector and expand into the ready mixed concrete sector.

CO2 is added to concrete during mixing, where it reacts with water to form carbonate ions. The carbonate reacts with calcium ions released from the cement to rapidly form a limestone-like material that disperses throughout the mix as a nanomaterial, permanently binding the CO2 within the concrete. This lowers a producer’s carbon footprint.

Brampton Brick acquired the assets of Ontario block manufacturer Atlas Block in January 2014. Part of the acquisition’s appeal included a partnership with CarbonCure. So far, the brick manufacturer has installed CarbonCure’s technology at its Hillsdale, Peel, and Brockville, Ont. plants.

# C I E N

CANADIAN INDUSTRIAL EQUIPMENT NEWS

## » Pumps

They're not for everything, but hygienic internal gear pumps offer benefits when used for food, pharmaceutical and personal care product applications.

The Hydraulic Institute has classified more than 30 unique types of rotary positive displacement (PD) pumps, each providing different features and benefits. Fortunately for the food and beverage, pharmaceutical/biopharm and personal care product industries, many are available in hygienic versions. The challenge is to find the right balance of performance, reliability, cleanability, maintenance, capital cost and operating cost.

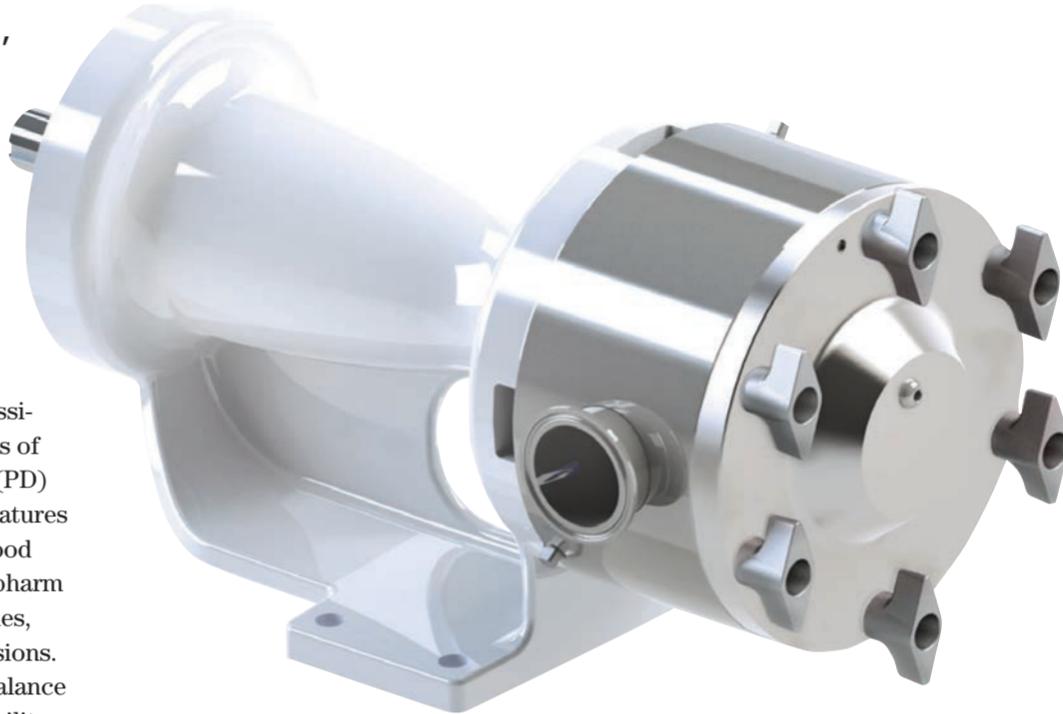
The internal gear pump, a rotary PD (which means with every rotation of the shaft, the pump draws in and then displaces the same volume of liquid) recently became available in hygienic versions. Benefits include:

- Easily adjustable flow rates using a variable speed drive, since the flow is directly proportional to the speed of the motor.
- Flow independent of changes in system pressure, enabling accurate metering into batches.
- Reversible direction of flow to strip the line of product, reducing waste, plus water and chemical usage during CIP.
- Ability to handle a wide range of viscosities, from milk to peanut butter.
- Minimal product degradation due to shear. Rotary PD pumps can be operated at very low speeds to minimize shear.
- Smooth flow and high efficiency to improve flow meter accuracy and reduce splashing when discharging into tanks or packaging.

The rotor gear (connected to the driver shaft, which is connected to the motor), turns the driven gear (idler) in the pumped liquid, so no timing gears are needed. The idler gear rotates on a fixed shaft (idler pin) mounted to the pump head. The gears unmesh on the suction side and spaces between the gear teeth carry liquid from the suction to discharge side where the gears then mesh to expel the liquid.

Advantages compared to timed pumps include only one shaft seal, no timing gears or lubrication, and ease of maintenance (no shimming).

Advantages versus PC and peristaltic pumps include short-term run dry capability without particle shedding, easy



Internal gear pumps provide greater reliability and reduce maintenance in specific applications.

PHOTO: VIKING PUMP

## Internal GEAR pumps

### SIX REASONS TO USE HYGIENIC VERSIONS

in-line or 90-degree porting, and ease of in-place disassembly for coefficient of performance (COP) or post-clean in place (CIP) inspection.

Disadvantages compared to both timed and PC/peristaltic pumps include inability to pass large solids (like whole fruits) and limited differential pressures (150 psi/10 bar).

Timed lobe, circumferential piston and twin-screw pumps are excellent performers, but their overly complicated design is overkill if you are not pumping large solids or if you don't need differential pressures exceeding 150 psi (10 bar).

Consider internal gear pumps for those easy applications. Similarly, progressive cavity or peristaltic pumps may be a great choice for slurries of whole berries, but for strawberry jelly or jam, an internal gear pump offers significant

benefits in terms of higher reliability and reduced maintenance.

Here are six reasons to consider hygienic internal gear pumps rather than other types of rotary PDs:

**1. Only one shaft seal.** A survey of 1 pump repair shops demonstrated that mechanical seals are the greatest cause of pump downtime and maintenance. If a pump has two seals instead of one, it essentially doubles the odds of failure, not to mention the cost of replacements. If a pump is cleaned-out-of-place, it also speeds up disassembly and reassembly time by a third compared to pumps with two seals. If you're cleaning 10 pumps a day, that adds up.

**2. 90-degree or in-line mounting.** The choice is yours for mounting directly under tanks, or opposite ports for simple in-line mounting. That means

Continued on page 22

## » Supply Lines



Harting takes its show on the road.

PHOTO: HARTING

### HARTING ON NA TOUR

The Harting Roadshow Truck is touring North America to showcase its connectivity products, including industrial connectors, cable assemblies, board level connectors, backplane assemblies, ethernet switches and its industrial RFID product.

It's part of the German manufacturer's expanded educational program through its web-based portal HARTING-U.com

The truck started from New York Sept. 18 and was to hit Montreal on Oct. 14. It will stop in BC Nov. 11.

Visit [www.HARTINGRoadshowTour.com](http://www.HARTINGRoadshowTour.com).

### MONCTON EXPANSION

Atlas Copco, a Swedish supplier of sustainable productivity solutions, has acquired a New Brunswick firm that sells and services air compressors and air treatment systems.

Air Repair Sales and Services Ltd., based in Moncton, is an authorized Atlas Copco distributor with 12 employees. It will join Atlas Copco Compressors Canada and its Compressor Technique Service division.

### NEW HQ FOR RENISHAW

Renishaw Inc. has broken ground on its new North American headquarters.

The UK-based technology company is building a 133,000 square-foot office and warehouse facility in West Dundee, Ill.

The new building consolidates two existing sites, is slated for completion in June 2016 and will include space for product development, testing, warehousing and distribution.

### SUPER-SAFE ACCELEROMETERS

Hansford Sensors, a UK manufacturer of industrial accelerometers, has achieved new certification for its products that meet intrinsically safe standards for hazardous areas in North America and Canada.

The HS-100IS and HS-420IS are designed so the electrical or thermal energy never becomes great enough to cause a spark or ignition.

They're certified to the North American Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations and the Canadian Standard for Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations.

## Easy-to-use

Continued from page 21

you can insert a pump anywhere along a length of straight pipe. Opposite port pumps also give you the capability of vertical orientation, which allows complete self-draining prior to cleaning, and is required for European Hygienic Engineering & Design Group (EHEDG) certification.

**3. No oil to change.** Internal gear pumps use sealed antifriction bearings with food grade grease and require no re-lubrication. Pumps with timing gears and bearings in a lubricated gearbox usually require oil or grease changes at least four times per year, or more in humid, washdown environments. These gearboxes allow humid air into the gearbox through the breather or oil seal as it cools down, causing internal condensation and lube failure.

**4. Same pump for COP or CIP.** Designed for ease of disassembly and reassembly in-place, internal gear pumps feature front-removable rotor and idler, shaft seal and casing for COP. Yet the same pump can be configured to be completely CIP-able. Pumps with EHEDG certification for in-place cleanability have been rigorously tested and validated for in-place cleanability. For COP processors considering CIP in the future, this means they can use the same pump for either, while many other pumps require factory modifications for CIP, if they can be made CIP-able at all.

**5. Fast, easy end clearance adjustment – no shim-ming.** Clearances are adjusted on rotary PD pumps to optimize the performance based on the viscosity, to prevent rotor/casing contact due to expansion from high temperatures, and to compensate for wear over time. Internal gear pumps enable easy end clearance adjustment by rotating the threaded rear bearing housing. Rotate it clockwise until the rotor contacts the head, then back it off counter-clockwise a set distance per 0.001 inches of clearance required, and lock it down with set screws. This takes about five minutes. Pumps must be timed to ensure their elements never actually contact each other, often using shims, which also set end clearances. It usually takes several hours to assemble, measure, disassemble, shim, reassemble and measure. Sometimes the process has to be repeated to get it just right.

**6. Dimensionally interchangeable with existing gear pumps.** There is a large installed base of internal gear pumps from several manufacturers handling low hazard foods such as edible oils and personal care intermediates that comply to an unofficial dimensional standard set long ago by the market leader. Hygienic internal gear pumps also fit that standard and are available with ANSI-compatible flange ports to drop into these low hazard applications, or with hygienic ports for higher hazard liquids like dairy. As hygiene requirements become more stringent, replacement of “industrial” pumps with hygienic pumps will be commonplace on even low hazard materials.

Internal gear pumps excel in many applications including edible oils, chocolate and peanut butter; sugars, sweeteners and confectionary; jams and jellies, sauces and pastes. In the pharma and personal care world, they are especially well suited to syrups and ointments, lotions and creams, and hair care products.

Additional information on all types of rotary displacement pumps is available at [www.pumpschool.com](http://www.pumpschool.com).

*This article is an edited version of a longer white paper written by John Hall, a senior product manager at Viking Pump Inc., a pump manufacturer based in Cedar Falls, Iowa. Viking Pump Canada is based in Windsor, Ont. Visit [www.vikingpumpcanada.com](http://www.vikingpumpcanada.com).*

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).

## Dust, fume, filtering



Twin venturi vacuum.

### AIR-POWER FOR RISKY ENVIRONMENTS

Vac-U-Max's 55-gal., air-powered industrial vacuum (Model 40013), for environments where there's a risk of fire or explosions, is completely grounded and bonded to meet the NFPA 70 requirements. Because it doesn't use electricity, it doesn't generate heat during operation.

The twin venturi power unit delivers suction power to 16 in. Hg (208 in. water); airflow of 200 scfm; a 2-in. suction connection; air operation requiring 70 scfm @ 60 psi compressed air; a compressed air connection of 3/4 in. NPT (female); and noise levels below 80 dbA @ 6 in. Hg.

A static conductive high-pressure 0.75 x 25 in. long hose connects the power head to a compressed air supply.

Vac-U-Max is a manufacturer of pneumatic components based in Belleville, NJ.

[www.vac-u-max.com](http://www.vac-u-max.com)

### HEAVY-DUTY CLEAN UP

Handte EM Profi emulsion mist collectors from Camfil Air Pollution Control (APC) handle heavy clean ups for contaminants generated during milling, drilling, tapping, turning, grinding and other machining processes that use emulsion mist coolants.

The collector uses long-life coarse and fine filter demisters followed by a final-stage HEPA filter with combined efficiencies of 99.9% on particles of 0.3 micron and larger.

This is much higher than capture efficiencies achieved with fibre-glass V-bag filters, which lose efficiency as media becomes saturated. A patented automatic sprayer counteracts emulsion clumping, ensuring that the separators



High capture efficiency.

operate 24/7 almost maintenance-free.

The unit is easily serviced from the ground by a single technician, eliminating extra manpower and lift equipment. Service life between change-outs is up to six years for demister filters and two years for HEPA filters.

Large maintenance doors and quick-clamping elements make tool-less filter replacement fast.

Basic modules handle air volumes from 1,700 to 8,000 cfm, with a wide range of accessories and configurations. Modules combine to accommodate larger airflow requirements. Small space-saving models handle low airflow applications of 500 to 1,400 cfm.

Camfil APC is a manufacturer of dust and fume collection systems based in Jonesboro, Ark.

[www.camfilapc.com](http://www.camfilapc.com)

### CLEAR FUMES FROM BREATHING ZONES

Ductless Spray Booth downdraft tables from Lev-Co are dual-purpose workstations and filtration stations for aerosol fumes and other airborne gases and odours.

They draw contaminants away from workers' breathing zones without hindering movement. Contaminated air is then filtered and returned to the facility.

Applications include spray-painting with spray balms or air brushing, gluing and open cans of paint. Features include a first-stage water filter, second-stage washable particulate filter and third-stage secondary activated carbon filter. There's an optional fourth-stage filter for a variety of adsorption medias. The tables are made of steel with a 22 x 25-in. footprint and a 36 x 24-in. work surface. Workstations have a 1.1 kw (1.5 hp) motor, motor starter, overload protection, plug and switch.

Lev-Co is a supplier of air pollution control products based in Port Perry, Ont.

[www.lev-co.com](http://www.lev-co.com)



Filtered air returned to the facility.

**TRIM COLLECTOR IS PORTABLE**

AirTrim's MITS-AIO/2- MX portable trim collection unit chops and collects PSA matrix and edge trim from PSA label presses.

It includes control, trim intakes, duct, fan, silencers, cutter and a dust filter all housed in a powder-coated steel cabinet. The air/material separator unit allows flexibility for location and sizing.

Shredded output is fed through ductwork to a collection hopper. The unit is built around Lundberg Tech cutter technology for cutting aggressive adhesive found on label matrix.

The unit allows presses to operate more hours per week, and also delivers faster press speeds, potentially reducing raw material costs.

It weighs about 500 lb. and is mounted on heavy-duty lockable casters for easy movement from one machine to another. The trim collector handles 208/240/480 V at 60 Hz. UL-certification is optional.

AirTrim is a supplier of pneumatic material handling systems based in Springfield, Ohio. [www.airtrim.com](http://www.airtrim.com)



*Fast press speeds.*

**BAGHOUSE HANDLES LARGE VOLUMES OF MATERIAL**



*Inspection/explosion relief doors.*

Nederman Canada Ltd.'s NFSZ3000 baghouse dust collector handles large volumes of material concentrations. It's modular, made of galvanised steel sheet with a telescopic support and is suitable for outdoor use.

It comes in two widths, type E 1200 mm (47 in.) and type J 2400 mm (94 in.).

Each filter module is fitted with a combined inspection and explosion relief door. The filter is fitted with the unique patented SUPERBAG. Medium-sized/large particles are separated in the filter hopper and the inlet section (optional). Air is then distributed to the filter bags. The collected material is discharged via the rotary valve, which is used for non-pressurised material discharge to a silo, container or separate transport system.

The filter is supplied either for continuous operation or with a break to clean the filter bags every four hours.

Nederman Canada Ltd. is a supplier of industrial filtration products based in Mississauga, Ont.

[www.nederman.com](http://www.nederman.com)

**AIR KNIFE BLOWS AWAY DUST**

EXAIR has expanded its Long Super Ion Air Knives to range from 60 in. (1,524 mm) through a maximum length of 108 in. (2,743 mm).

The knives are one-piece construction that ensures seamless airflow and eliminates coupling multiple short length air knives together. Overall height is reduced by 0.5 in. making it a better fit for tight spaces.

Materials and sizes are from 3 to 108 in. in aluminum or 303 and 316 stainless steel.

The air knives neutralize static electricity while blowing away dust and particulates from wide webs and printed surfaces, paper, plastics, wood, acrylic and three-dimensional shapes.

The wide laminar airstream full of static eliminating ions is effective at high speeds and cleans up to 20 ft. away.

The air knife operates down to 5 psig and uses minimal compressed air to entrain high volumes of surrounding room air. Its shockless design is UL component recognized to US and Canadian safety standards.

EXAIR Corp., based in Cincinnati, is a manufacturer of compressed air-operated products.

[www.exair.com](http://www.exair.com)



*Cleans wide surfaces.*



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**Faster – better – everywhere.**

**Thousands of Solutions. One Class, Rittal Class™.**

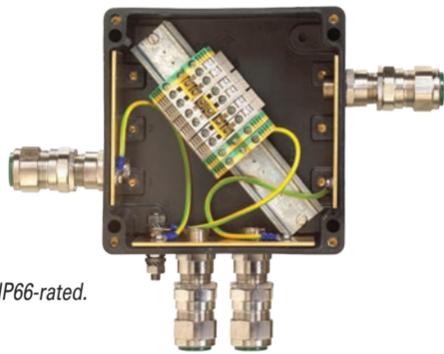
Be it large or small scale manufacturing, Rittal is ready to respond with the right kind of solution to fit your application perfectly. Our unique 'Custom from Standard' design process and industry-leading innovation are your guarantee of timely implementation and a budget that fits your needs. Around the world, the most discriminating industry professionals place their confidence in Rittal Class for their mission-critical applications. Join them. We invite you to find out more.

Visit [www.rittal.ca](http://www.rittal.ca)



FRIEDHELM LOH GROUP

## ENCLOSURES



IP66-rated.

### ENCLOSURES HANDLE HAZARDOUS ENVIRONMENTS

Emerson Industrial Automation's Appleton JBEP polyester enclosures and junction boxes protect instrumentation, terminals and electrical equipment in petrochemical, wastewater treatment, offshore drilling and other hazardous environments, including food processing subject to frequent washdowns.

An IP66 rating prevents water ingress, and they're enclosed in non-metallic housings to optimize performance. The 5-mm fibreglass reinforced polyester enhances durability with an IK10 impact rating of 20 j. It resists static buildup to eliminate the risk electrical discharge because the material is carbon filled.

The enclosures and junction boxes (85 x 85 x 60 mm to 750 x 320 x 230 mm), are simple to specify with global certifications and there's no need to recertify after field modifications.

They're modular and couple easily for specific application and footprint requirements, with a choice of empty, undrilled boxes as well as preconfigured versions for instrumentation or electrical and power applications.

The enclosures are certified for ATEX and IECEx locations worldwide. IEC, cC-SAUs, NBR, Inmetro and GOST certifications are pending.

Emerson is a manufacturer of industrial automation technologies based in St. Louis, Mo.

[www.appletonelec.com](http://www.appletonelec.com)

### SAFE IT IN HARSH ENVIRONMENTS

Schneider Electric's Smart Bunker is a modular safe for servers and standard IT equipment that provides the same level of functionality and security 24/7 as a data centre in either 23U or 46U industry standard rack configurations.

Totally insulated and thermally efficient, the unit protects against fire, flood, humidity, vandalism and EMF effects in harsh industrial environments and is used to reduce latency and quickly add capacity.



Thermally efficient.

The single enclosure includes power, cooling and management software to support a self contained, secure computing environment.

Schneider is a global developer of energy management and automation technologies with Canadian operations in Mississauga, Ont.

[www.schneider-electric.com](http://www.schneider-electric.com)

### BULKHEAD HOUSING SETS NEW CONNECTOR BASELINE

Harting's Han B IP67 bulkhead mounted housings are an alternative to IP65-rated connectors and provide IP66- and IP67 protection for applications in extreme conditions such as wind turbines, construction cranes, railway and marine installations.

A special flange protects the gasket seal, keeping water out of the connector. A circumferential collar prevents the seal from sliding inwards or outwards



Can be immersed in water.

and Harting's Han-Easy Lock locking system enhances contact pressure.

In the locked state, IP67 protection permits temporary full immersion in water compared to IP65 versions, which are only hose proof.

The bulkhead housing is compatible with standard Han hoods and housings, and is configured with any Han insert or module. It comes in 6B, 10B, 16B and 24B sizes that fit existing Han housing cut-out dimensions.

HARTING is a global connector manufacturer based in Germany with a Canadian sales office in Montreal. [www.harting.ca](http://www.harting.ca)

## SENSORS

### SENSORS HANDLE THE HEAT

Macro Sensors' HPGS hermetically sealed, high-temperature LVDT linear position sensors are equipped with a screw-on radial connector that prolongs operation in high vibration and dirty environments.



Reduces downtime.

The secure screw-on radial connector ensures the position sensor withstands constant, heavy vibrations.

A through-bore design provides access to either end of the LVDT core to improve mechanical support and core guidance as well as easier cleanout. The radial connector also gives the LVDTs a shorter installed length compared to units of the same range with axial connectors for tight spaces.

Macro Sensors is a sensor manufacturer based in Pennsauken, NJ.

[www.macrosensors.com](http://www.macrosensors.com)

## MOTORS

### GROUND STRAPS PROTECT AGAINST VFD CURRENTS

AEGIS' high-frequency ground straps ensure a very low-impedance path to ground for the high-frequency currents generated by VFD-driven motors and systems for long-term bearing protection.

Non-zero impedances within a ground system can give rise to transient voltages and ground system currents that travel along motor shafts.

The straps channel currents away from bearings and safely to ground through

the motor frame, mitigating frosting and fluting damage, premature bearing failure and costly motor system downtime.

High-frequency grounding straps bond the frames of motors and other system components to equalize their earth potential and eliminate ground loops.

The 12-in.-long flat-braided, tinned copper straps have a circular hole on one end for easy installation around the foot mounting screw of NEMA- or IEC-frame motors, and a ring terminal on the opposite end.



Eliminates ground loops.

Custom lengths and terminations are available.

Aegis is a manufacturer of bearing protection rings and associated technologies based in Mechanic Falls, Me.

[www.est-aegis.com](http://www.est-aegis.com)

### MAGNETS IMPROVE MOTOR TORQUE TO INERTIA RATIO

Pittman Motors EC042B brushless DC motors are equipped with a NEMA-17 mounting configuration that adapts to most metric mounting requirements so they're easy to upgrade for many stepper motor applications.

The motors, available in three motor lengths with a continuous torque range of 11 to 31 Ncm (peak range of 35 to 99 Ncm), have a maximum rpm of 9,000 and are used with DC bus voltages up to 96 V. There are eight standard winding variations and custom windings to meet exacting end-product requirements.

A high-energy, 4-pole rotor with rare earth magnets improves the motor's high torque to inertia ratio. The stator assembly is produced with low-loss materials for higher-speed applications. Shielded ball bearings support the motor shaft, which is preloaded to reduce vibration.



DC bus voltages up to 96 V.

Pittman PLG42S and PLG52S planetary gearboxes and optical incremental encoders are optional with line counts up to 2048, three channels and line driver.

Pittman is a manufacturer of DC motors based in Harleysville, Pa.

[www.pittman-motors.com](http://www.pittman-motors.com)

## RELAYS

### RELAYS ARE SHOCK, VIBRATION RESISTANT

AutomationDirect's industrial relays now include additional electromechanical and solid state versions, such as the 10 A 750R series for power to sequence controls in factory machines and control panels.

Fitted with an octal base, silver alloy with gold flashed contacts and 1,500 Vrms open-contact dielectric strength, the relays are used in electrical control panels that require stability and reliability, along with high shock and vibration resistance.

The UL recognized, CSA and CE/RoHS/REACH approved relays come in double-pole, double-throw and three-pole, double-throw styles with 12 and 24 VDC and 12 to 240 VAC coil input voltages.

A flag indicator shows relay status in manual or powered condition, while an LED indicator shows proper functionality and manual operation is powered by a pushbutton without power to the coil. An ID tag/write label identifies relays in multi-relay circuits.

Additional AD relays come in 22- and 45-mm zero-cross and random-switching versions. The AD-SSR series relays are rated to 90 to 280 VAC, 90 to 140 VAC and 4 to 32 VDC input ranges and contact ratings are 10, 30, 45 and 65 A.

They're DIN rail or panel mountable and are fitted with integral finger-safe covers and heat-sinks, an internal RC (snubber) network and RFI suppression.

AutomationDirect is a supplier of automation products based in Cumming, Ga.

[www.automationdirect.com](http://www.automationdirect.com)



12 to 240 VAC coil input voltages.



Hygienic connections.

**MOTORS STREAMLINE IP69K CONNECTIVITY**

B&R Automation's stainless steel motors meet strict hygienic standards and are fitted with a special connector that allows them to be connected and disconnected in the field.

The connector technology makes the motors much easier to work with and allows the machine to be cabled as usual, even in areas with heightened hygienic requirements.

Damaged cables are simply unplugged and replaced without changing out the entire motor.

They have an IP69K rating and meet EHEDG, 3A and FDA hygiene standards.

The FDA-approved hybrid cables are heat resistant up to 150 degrees C. Installation and maintenance is simplified thanks to the IP69K-rated connector.

B&R is a manufacturer of industrial automation technologies based in Atlanta.

[www.br-automation.com](http://www.br-automation.com)

**WELDING**



Pipe diameters from 6 to 96 in.

**PURGE SYSTEM SEALS AIRTIGHT**

Huntingdon Fusion Techniques' inflatable weld purge dams make easy work of closure welds, tight bends, T piece joints and dome end connections where a conventional tandem weld purging system can't be used.

Manufactured for pipe diameters from 6 to 96 in., the lightweight system is easy to inflate, and once inflated, it seals the internal circumference of the pipe. Excess inert purge gas spills out and purges the space around the weld joint, which then forces air out.

Each dam is equipped with a purge/inflation hose (black), an extra purge gas hose (blue) and a hose for connecting a Weld Purge Monitor (red).

The blue hose passes extra gas into the weld zone to cool welds and meet interpass specifications or provide extra inert gas in titanium, zirconium or special stainless applications that require a guaranteed zero colour weld.

By producing shiny welds, there

is no porosity or loss of corrosion resistance caused by oxidation. The system also eliminates the difficulties of cleaning an oxidized weld to cut costs and material requirements.

Huntingdon Fusion Techniques is a manufacturer of weld purging products based in Burry Port, UK. [www.huntingdonfusion.com](http://www.huntingdonfusion.com)

**TRANSDUCERS**



1,500 psi safe overload rating.

**TRANSDUCERS PROVIDE ACCURATE FLOW MEASUREMENTS**

tecsis LP's XPDM medium range differential pressure transducers are equipped with a bi-direction wet/dry design for ranges from 0-50 to 0-1,500 psid and uses a proven strain gauge technology for predictable results. They're accurate to 0.25% in flow monitoring and liquid level applications.

The stainless steel transducers come in amplified and mV/V output versions with several electrical connection combinations. They require a standard 2 mV/V output and 10 Vdc excitation. Amplified output of 0-5 Vdc, 0-10 Vdc or 4-20 mA is also available. Operating temperatures are -53 to 120 degrees C, compensated from 15 to 70 degrees C.

Sensors are fully welded with 17-4PH stainless steel wetted parts and have a safe overload rating of 1,500

psi on either side.

tecsis LP is a manufacturer of pressure and load sensors based in Worthington, Ohio.

[www.tecsis.us](http://www.tecsis.us)

**CONNECTORS**

**PROFINET CONNECTS IN TIGHT SPACES**

Helukabel's Helukat RJ45 Cat5 IP20 Profinet plug connectors provide transmission rates up to 100 MHz.

A metal housing provides IP20-rated protection for both the linear, 180-degree version and angled, 90-degree version used for tight spaces.

Both models operate in temperatures between -20 to 70 degrees C and are compatible with AWG 22 and 24 cables with both bunched and solid wire conductor types.



IP20-rated protection.

Coloured contact elements eliminate connection errors. Clear labelling matches the wire sequence of the Profinet standard. The single wires must be arranged in accordance with the colour coding of the RJ45 plug and inserted into the contact points up to the stop. For a full connection, the user presses the guide element downward to the stop, closes the housing cover, and fixes the front screw cap with a quarter rotation.

Helukabel USA Inc., a US subsidiary of Germany's Helukabel GmbH, manufactures cables and wires in Chicago.

[www.helukabel.de](http://www.helukabel.de)

**FASTENERS**

**R'ANGLE STRONG ATTACHMENTS**

PennEngineering's R'ANGLE fasteners for thin metal assemblies and PCBs create strong right-angle attachment points for tighter design control, reduced hardware counts and production economies for chassis, chassis to board or component to board applications.

Self-clinching types install permanently into metal sheets and ReelFast SMT surface mount versions for printed circuit boards.

The fasteners replace conventional bent edge tabs, bent centre tabs, bent flanges, angle brackets or tack welds.

Type RAA aluminum fasteners install in aluminum sheets as thin as .040 in. and accept thread-forming screws in sizes #4-40, #6-32, #8-32, and M3 and M4. Type RAS steel threaded fasteners install in aluminum or steel sheets as thin as .040 in. and are available in thread sizes #4-40, #6-32, #8-32, and M3 and M4.

A single mating screw completes the attachment process. Holding power of the fastener is unaffected by tightening or loosening of the screw.

The fasteners install at the edge or interior of boards (as thin as .040 in.) prior to the automated reflow solder process. Thread sizes for mating screws range from #2-56 through #8-32 and M2 through M4.

PennEngineering is a fastener manufacturer based in Danboro, Pa.

[www.pemnet.com](http://www.pemnet.com)



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## LIGHTING



Voltage inputs of 100 to 277 VAC.

### LEDs CUT ENERGY USE BY 85%

LEDtronics Inc.'s UL-listed, omnidirectional LED corn bulbs provide 360 degree illumination and drop into existing enclosed lighting fixtures, such as pendants, bollards and explosion-proof fixtures.

The LED post tops come in a white polycarbonate body with an aluminum heat sink. The bulbs, ranging in wattages from 9 to 120, replace incandescent, halogen and metal halide lamps that consume up to 400 W.

Bypassing the ballast reduces energy consumption and allows the bulbs to operate in a voltage input range of 100 to 277 VAC. They come in E26 medium base and E39 mogul base versions that handle temperatures between -20 to 65 degrees C.

The ROHS-compliant, UL-listed LED bulbs direct an even, omni-directional

beam of 5,700 – 6,300 K pure-white illumination, with lumens ranging from 1,020 (9 W) to 15,600 (120 W).

Because LEDs have no filament, they're shock and vibration resistant, and don't require frequent switching. LEDs don't emit large amounts of heat with little to no ultraviolet or infrared light.

LEDtronics Inc. is a manufacturer of LED lighting based in Torrance, Calif. [www.ledtronics.com](http://www.ledtronics.com)

## VALVES

### MICRO VALVES ENHANCE AUTOMATED ASSEMBLY

Nordson EFD's xQR41 MicroDot needle valve is 60% smaller than standard valves and is equipped with an exchangeable modular design that enhances customization options and process control.

The company's Quick Release technology allows full change outs of wetted parts quickly to reduce downtime and



Small 66 x 23.7 mm profile.

enhance productivity.

Its small 66 x 23.7 mm profile allows multiple valves to be mounted closer together to increase output per batch, improving production throughput. The valve dispenses in tighter spaces and at more complex angles. Weighing only 141.4 g, it reduces tooling payload to increase actuator arm speed, but also reduces tabletop automation (TTA) motor and belt wear.

The pneumatically-operated, adjustable valve's small form factor also creates a smaller wetted path, which reduces retained volume to minimize fluid waste. It's fed from a variety of reservoirs, syringe barrels, external cartridges or tanks.

It applies precise micro-deposits as small as 150 µm of low- to high-viscosity fluids onto a substrate. An exchangeable modular design is configured with stroke adjustable or non-adjustable cap, Backpack valve actuator, low-profile mounting block, and 90-degree air and fluid inlet fittings.

The fluid body is aligned and locked at 360 degree intervals for mounting, positioning and fluid inlet alignment needs.

Nordson EFD is a manufacturer of fluid dispensing systems based in East Providence, RI.

[www.nordsonefd.com](http://www.nordsonefd.com)

## MATERIAL HANDLING

### PALLET LEVELLER EASES MATERIAL MOVING

Southworth Products' PalletPal Walkie mobile leveller mounts to any standard electric walkie or walkie/rider pallet truck to make order picking faster, safer and easier.

The loaders use a calibrated spring mechanism to automatically adjust the height of a pallet load as boxes are added or removed. The top layer of the load is always at a comfortable, convenient working height that allows employees to load or offload items without bending or stretching.



Anti-slip surface.

A reinforced baseframe has generous flared openings at the end of each channel to receive the forks of standard electric walkies for easy pickup and drop off without binding. Once loaded onto the pallet truck, the PalletPal walkie is ready for use without adjustments or modifications. Whether under load or empty, it won't slip on the forks.

The platform has an anti-slip surface and accepts any type of pallet or skid including GEO and half pallets. Platform recesses and non-skid base treads allow workers to step up close to the load to minimize reaching across the pallet.

Southworth Products is a manufacturer of material handling products based in Portland, Me.

[www.southworthproducts.com](http://www.southworthproducts.com)



2 m of vertical travel.

### BAG CONDITIONER ADJUSTS AUTOMATICALLY

Flexicon's Block-Buster Hydraulic Bulk Bag Conditioner handles bags from short to extra tall using hydraulically-actuated rams that automatically adjust in height during conditioning cycles.

Hydraulic bulk bag conditioners loosen bulk materials that can't be loosened by pneumatically-actuated flow promotion devices.

The rams provide 2 m of vertical travel, roughly double the range of most conditioners that use scissor lifts to raise the bag, while the fixed-height turntable reduces loading deck height by about 50%.

The user programs single or multiple heights for the rams to condition the bag, the amount of pressure applied by the rams' contoured end plates, actuation frequency and the number of 90-degree rotations the turntable makes to loosen solidified materials for discharge.

The system controller is mounted remotely or on the exterior of the safety cage, which is fitted with full-height, safety-interlocked doors.

The unit measures 87 x 133 x 78 in. and is available in stainless or carbon steel with durable industrial coatings.

Flexicon is a manufacturer of bulk material handling technologies based in Bethlehem, Pa.

[www.flexicon.com](http://www.flexicon.com)

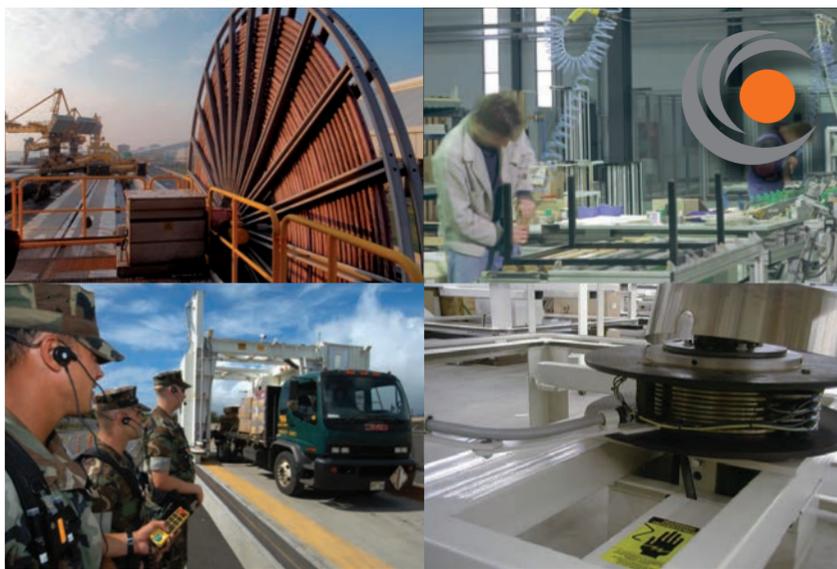
### CASTERS PROVIDE A SMOOTH RIDE

Hamilton Caster's Spinfinity heavy-duty casters are CNC-machined to create a large internal and enclosed seal made from nitrile butadiene rubber (NBR) to keep lubricating grease in and contaminants out.

Extra thick forgings and kingpinless swivel technology enhances durability and the top plate and inner raceway are a single forged steel piece to maximize strength. The raceways are CNC-machined and hardened to a uniform depth



Smooth movement.



## High-Performance Energy and Data Transmission Systems

Conductix-Wampfler's mission: To keep your operations running 24/7/365 with rugged, reliable energy and data transmission systems. Our conductor bar, cable reels, festoon systems and crane controls are time-tested in the most demanding environments and backed by a worldwide sales and service network unmatched in our industry. We have over 60 years of experience applying our complete line of mobile electrification and ergonomic products to real-world industrial applications.

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so movement is smooth.

The maintenance-free casters, available in three models with wheels in widths from 2 to 3 in. handle loads between 2,500 to 3,200 lbs.

Hamilton Caster is a manufacturer of material handling equipment based in Hamilton, Ohio.

[www.hamiltoncaster.com](http://www.hamiltoncaster.com)

## TEST AND MEASUREMENT

### UHH2 SHARES LOGGED DATA OVER WI-FI

Dwyer Instruments Inc.'s UHH2 test equipment delivers the company's Mobile Meter software app on a rugged IP68-rated Android-based handheld for building commissioning and balancing, and testing HVAC equipment.

Wireless anemometer, hygrometer and pressure probes communicate to the handheld using Bluetooth SIG wireless technology and display data simultaneously from the handheld over Wi-Fi, GSM or CDMA networks.

The weatherproof housing withstands 1.5 m drops and the 450 g. unit is powered by a 2,000 mAh lithium-ion battery. It operates in temperatures between -20 to 60 degrees C.

Each CE- and FCC-approved package includes a handheld base unit, wireless mobile gateway, two USB charging cables, charging block, mini-screwdriver, user manual and headphones.

Dwyer is a manufacturer of test and measurement products based in Michigan City, Ind.

[www.dwyer-inst.com](http://www.dwyer-inst.com)



IP68-rated.

## PUMPS

### PUMPS HANDLE PEAKS LOADS OF 400 BAR

Hawe Hydraulics' V40M-028H axial piston pump is ideal for hydraulic fan controls in mobile machines, capable of displacing volumes up to 28 cm<sup>3</sup>/rev.

It handles maximum operating pressures of 380 bar and peak loads of 400 bar. An optional PIR1 controller helps the pump comply with emission stipulations defined by Tier 4 Final and Euro 6 standards.



Cuts fuel consumption.

The controller continually adjusts the pump so the fan's cooling output is fine-tuned to the temperature of the machine's engine. It increases pressure in the event of power failure to protect against overheating.

The pump mounts directly to a diesel engine and takes up little space with a width of just 5.2 in. and length of 7.2 in. Multiple fans can be deployed independently depending on the installation space within the machine and cooling needs.

By continuously adjusting the cooling output, the hydraulic control also activates the fan once the machine's engine reaches its operating temperature. In cold temperatures, the fan doesn't activate, cutting down on fuel consumption and noise emissions.

Hawe is a manufacturer of industrial hydraulic components based in Charlotte, NC.

[www.hawe.com](http://www.hawe.com)



Flow rates up to 875 cubic metres per hour.

### PUMPS HANDLE EXPLOSIVE ENVIRONMENTS

KSB Pumps' RPHb two-stage, long-coupled pumps handle process applications in refineries and chemical plants.

They're rated for heads of up to 650 m and flow rates as high as 875 m<sup>3</sup>/hr in temperatures between -80 to 450 degrees C.

The rugged pumps have a back pull-out design to ease impeller servicing and allow access to seals and bearings without disconnecting or moving the main casing.

They're available in a variety of materials to ensure compatibility with a range of pumped media, including water and petroleum products. ATEX-rated models handle environments with high levels of explosive flammable gases.

KSP Pumps, based in Mississauga, Ont., is a member of the KSP Group, a global pump manufacturer based in Germany.

[www.ksb.ca](http://www.ksb.ca)

## MACHINING



3.2 in. bar working diameter.

### TURNING CENTRES IMPROVE OPERATOR ERGONOMICS

Doosan has expanded its range of Puma GT turning centres with four new models that includes features such as a ridge 30 degree single piece sland bed design, box guideways, fast non-lifting servo driven turrey and EZ Guide conversational programming system.

Standard chuck size is 10 in. (optional 12 in. available) with a maximum swing over bed of 24.8 in. and swing over saddle of 18.1 in. Maximum turning length is 25.9 in. on the standard GT2600; 24 in. for the GT2600M, while the long bed versions offer 42.4 in. on the GT2600L and 40.6 in. on the GT2600LM.

The maximum bar working diameter is 3.2 in. on all four models.

Box guideways are applied to all axes to increase dampening and rigidity for deep, powerful cuts. The single-piece slant bed design reduces the centre of gravity of both the spindle and cross slide by 12%, minimizing thermal growth.

The spindle, with a maximum speed of 3,500 rpm, has three angular ball bearings in the front and cylindrical roller bearings in the rear to minimize thermal growth and increase precision. An optimized spindle overhang minimizes rotational inertial load to enhance rigidity and reduce acceleration and deceleration time.

The operating console has a Doosan-Fanuc i control with a large 10.4-in. colour TFT LCD monitor with USB port, PCMCIA Card, ethernet connectivity, QWERTY keypad and single-touch hot keys to simplify set-up and operation.

Doosan is a manufacturer of CNC machine tools and components based in Pine Brook, NJ.

[www.doosan.com](http://www.doosan.com)

## FITTINGS

### FITTINGS WITHSTAND EXTREME ENVIRONMENTS

Festo's NPQH fittings withstand extreme conditions, such as those found in food processing environments.

They're highly resistant to chemicals including common cleaning agents and lubricants, and handle high-pressure applications.

The electroless nickel-plated surfaces are abrasion and pressure resistant making them suitable for pneumatic applications with a temperature range up to 150 degrees C, and pressure range up to 20 bar.

Straight, L-, T- and Y-shape variants are available.

Festo is a manufacturer of automation and pneumatic equipment based in Esslingen am Neckar, Germany. It has Canadian offices in Mississauga, Ont.

[www.festo.com](http://www.festo.com)



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EMERSON Industrial Automation



Chachel, Business Development Analyst

## NOZZLES



Concentrated flat-fan pattern. loops.

### NOZZLES DELIVER PRESSURES UP TO 100 PSI

BEX's Airwisk nozzle produces a quiet, fast and concentrated flat-fan pattern of air to maximize cooling, drying and blow-off applications, while reducing energy costs.

The air stream is produced by discharging air through recessed orifices that produce a high-impact, high-accuracy flow. The nozzle is made of tough ABS material, rated at 150 degrees C with a maximum pressure of 100 psi.

Several mounting holes ensure accurate alignment. The nozzles mount individually or side by side, which increases coverage.

The nozzle's capacity ranges from 9.5 at 20 psi to 32.1 at 100 psi.

BEX is a manufacturer of spray nozzles based in Ann Arbor, Mich.

[www.bex.com](http://www.bex.com)

## POWER SUPPLY

### POWER SUPPLIES DELIVER 24 VDC OUTPUTS

MicroPower Direct's MDR-240S and MDR-120S compact DIN rail mountable AC/DC power supplies provide tightly regulated 24 VDC outputs for industrial applications.

Both models, which operate from a universal 85 to 264 VAC input, have an input/output isolation of 3,000 VAC, low output noise, line/load regulation of  $\pm 1\%$  and 92% efficiency. They're equipped for continuous short circuit protection (with auto recovery), output overvoltage protection, over temperature protection and output power limiting.

The power supplies, which meet EN 60950 and EN 55022 Class B requirements, are packaged in compact DIN



24 VDC outputs.

rail mount cases that attach to industry standard TS-35 7.5 and 15 mm rails. They operate in temperatures between -25 to 70 degrees C.

MicroPower Direct is a manufacturer of industrial power conversion products based in Stoughton, Mass.

[www.micropowerdirect.com](http://www.micropowerdirect.com)

## COMPUTING

### MODULE OPTIMIZES DIGITAL CONTROL AND MONITORING

ACCES I/O Products Inc.'s USB-DIO24-CTR6 digital I/O module provides portable, easy-to-install, industrial strength digital I/O and counter capabilities to PC or embedded systems for light, motion and process controls.

It's equipped with 24 lines of CMOS/LVTTL high-current digital I/O with two fully-undedicated 82C54's, yielding six counter/timers and access to the input, gate, and output pins in a compact enclosure.

A micro-fit USB header connector is provided in parallel with the high retention type B connector and is used for stacking and embedded OEM applications. Accessories include a variety of cables and screw terminal boards that connect easily.

The units are compatible with industry standard I/O racks such as Grayhill, Opto 22, Western Reserve Controls, and



DIN rail mountable.

an OEM version (board only) features PC/104 module size.

All I/O lines are buffered with 32 mA source/64 mA sink current capabilities and 8254 gate, input and output lines are independently accessible at the connector.

The board is integrated into any PC/104-based stack by connecting it to a USB port with embedded CPU form factors.

It measures just 3.5 x 3.775 in. and ships inside a steel powder-coated enclosure with an anti-skid bottom. A DIN rail mounting provision is available for installation in industrial environments and operates in temperatures between -40 to 85 degrees C.

ACCES I/O is a supplier of analogue, digital, serial communication and isolated I/O boards for industrial applications based in San Diego, Calif.

[www.accessio.com](http://www.accessio.com)

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## » Events

### CESSCF 2015

#### Junewarren-Nickle Energy Group

Oct. 28, Calgary

The Canadian Energy Supply Chain Forum (CESSCF) brings together buyers and sellers along the energy supply chain. Visit [www.supplychainforum.ca](http://www.supplychainforum.ca).

### Global Exports and Management of Supply Chains

#### CME-BC

Nov. 3-4, Coquitlam BC

This two-day FITTskills session identifies the stages of a global supply chain, covers the required documentation to move goods across borders and the different methods to enhance the performance and efficiency of international logistics. Presented by Canadian Manufacturers & Exporters – BC, in partnership with EDC and FITT. Visit [www.enterpriseacanadanetwork.ca](http://www.enterpriseacanadanetwork.ca) (click on Events).

### FABTECH 2015

#### SME

Nov. 9-12, Chicago

A North American metal forming, fabricating, welding and finishing event produced by SME, the Fabricators & Manufacturers Association, International SME, Precision Metalforming Association, American Welding Society, and the Chemical Coaters Association. Visit [www.fabtechexpo.com](http://www.fabtechexpo.com).

### Advanced Manufacturing Canada

#### SME

Nov. 18-19, Montréal,

The conference focuses on advanced manu-

facturing technologies, including automation and robotics, additive manufacturing/3D printing, materials and software for the Quebec market. Visit [www.advancedmfg.ca](http://www.advancedmfg.ca).

### 2016 AHR EXPO

#### International Exposition

Jan. 25- 27, Orlando, Fla.

The international heating, ventilation, air conditioning and refrigeration gathering featuring more than 2,000 exhibitors, plus education sessions. Visit [www.ahrexpo.com](http://www.ahrexpo.com).

### FABTECH Canada

#### SME

March 22 - 24, Toronto

For businesses that specialize in fabricating, metal forming, welding, and/or finishing. Visit <http://fabtechcanada.com>.

### RAPID

#### SME

May 16-19, Orlando, Fla.

Presented by SME, the RAPID conference and exhibition covers 3D printing, scanning, and additive manufacturing. Visit [www.rapid-3devent.com](http://www.rapid-3devent.com).

### ISCEA Supply Chain

#### Technology Conference and Expo

#### ISCEA

July 19-21, Chicago

ISCEA's annual gathering brings together supply chain, operations, engineering and finance professionals to share cutting edge technologies and best practices focusing on efficiency and profitability. Visit [www.sctechshow.com](http://www.sctechshow.com).

» Plantware



Communicates through multiple ports.

**GATEWAY TO IOT**

Diverbiss Corp.'s VersaGateway controller translates between protocols and enables cloud communications with the VersaCloud M2M platform. It translates between different serial bus protocols, logging system data to the full size SD card, or adding IoT capability to existing systems.

Two serial ports are user configurable as RS232 or RS485, and support MODBUS RTU/ASCII protocols as either a master or slave device. Serial ports are also directly programmable via the Structured Text programming language, allowing the implementation of custom protocols for communicating with bar code scanners, RFID readers or other serial devices.

Two CAN ports are available, one of which is isolated and configurable for NMEA2000 bus power. Both support SAE 1939 and NMEA2000 protocols. Ethernet and Wi-Fi ports handle MODBUS TCP server and client communications, as well as IoT communications with the VersaCloud M2M platform.

For applications that require data logging, the controller has a Real-Time-Clock, 512K of battery backed SRAM, and a full size SD card for data buffering and logging. When used with the VersaCloud M2M platform, data is date/time stamped and stored in the Cloud database for later viewing, analysis, and export.

The VersaGateway supports 9 to 32 VDC and has an operating temperature range of -40 to 80 degree C for use in extreme environments.

Diverbiss is a manufacturer of industrial electronics based in Fredericktown, Ohio.

[www.diverbiss.com](http://www.diverbiss.com)



Redesigned user interface.

**CAD/CAM GETS A FACELIFT**

Tebis America has released the latest version of its CAD/CAM software. Version 4.0 has a redesigned user interface for production processes in model, mould and die manufacturing.

The functions are accessed through self-explanatory icons with more feedback for the operator using modern colours and updated typography. A dark colour scheme is easy on the eyes with improved contrasts.

The status bar was reduced to maximize space for graphics, while the dialogue design has been revised and adapted to align with ergonomics requirements.

Menus on the function panel can be shown or hidden while freely designed work environments are saved and managed.

Tebis America, based in Troy, Mich., is a software company specializing in CAD/CAM systems for design and manufacturing.

[www.tebis.com](http://www.tebis.com)

**MOST POPULAR VACUUM CUPS**



Vi-Cas Manufacturing's new 16-page, full colour brochure details the company's most popular vacuum cups. In addition to dimensional information (including lip diameter, height and mounting holes), the new literature shows photos of each cup to guarantee accuracy. Vacuum cups and accessories are used extensively in all types of packaging and labeling operations. [www.vi-cas.com](http://www.vi-cas.com)

**Vi-Cas Manufacturing**

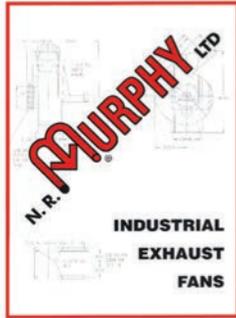
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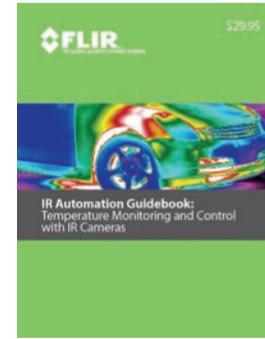
capacity to quickly modify or build a new fan. The free catalogue includes N.R. Murphy's line of fans, specifications and guidelines. [www.nrmurphy.com](http://www.nrmurphy.com)

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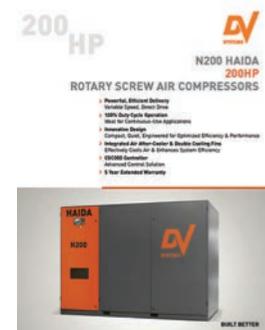
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The Haida N200 is a 200 HP variable speed, direct drive rotary screw air compressor that is extremely powerful, efficient and quiet operating at 100% duty cycle and is ideal for continuous-use applications. [www.dvcompressors.com/air-compressors/rotary-screw-air-com-](http://www.dvcompressors.com/air-compressors/rotary-screw-air-compressors/n200-haida/)

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**SCOTT'S DIRECTORIES**



# We don't need to worry about inflation

BY JOCK FINLAYSON

**A**cross most of the advanced economies, inflation is running well below the rates targeted by their central banks.

In the US, the principal inflation measure tracked by the Federal Reserve sits at barely 1%, despite an expanding economy and a tightening labour market. In Japan and the Eurozone, central banks have set policy interest rates at zero and are aggressively pumping money into the economy to avoid deflation. In both the UK and Canada, the short-term policy in-

**“A rising fraction of seniors means that more voters will be pressuring governments to keep inflation as low as possible...”**

terest rates directly controlled by central banks remain near all-time lows.

Almost everywhere, financial markets seem to be discounting the prospect of higher inflation.

Looking ahead, an argument can be made that we should worry less about the prospect of escalating costs and prices across multiple markets for goods, services, labour and raw materials. There are several reasons why.

One is an expectation of slower growth

in most of the Western economies, coupled with a diminution in projected growth for the world economy. Forecasts from central banks, international agencies, and private sector organizations all point in the same direction: average economic growth rates, both globally and in the major Western economies, will diminish in the coming decades, compared to the 60-year period that ended with the 2008-09 global downturn. Population aging and declin-

ing labour force growth are key factors in such assessments.

In a sluggish economic environment, aggregate demand is less likely to bump up against supply constraints – the situation that typically leads to higher inflation. This is doubly true given ongoing advances in technology that are adding to supply capacity in some industries.

A second reason lies in the burgeoning ranks of retirees. Many seniors fear they will outlive their nest eggs, especially in countries such as Canada and the US, where dwindling proportions of the population have access to guaranteed defined benefit pensions.

Inflation is a primary risk to the economic comfort of retired households. A rising number of seniors means that more voters will be pressuring governments to keep inflation as low as possible. In Western democracies, older age cohorts already exercise disproportionate political influence, and their clout will only increase as they become a bigger demographic force.

## Replacing labour

A third reason inflation rates may well stay unusually low is the waning power of “labour.”

Economists have found the share of national income accruing to workers has fallen in many countries – particularly since the 1980s. Weaker unions and the greater role that imports play in meeting local demand are part of the explanation. But more important factors are the impact of technological innovation and the declining real cost of “capital” – two closely linked trends that are prompting huge numbers of firms to replace labour with machines and technology.

To the extent that workers collectively have less bargaining power, the prospect of “cost-push” inflation driven by broadly rising real wages becomes increasingly remote. Wage pressures have been notably muted in the US, even as America’s economy has steadily expanded and the unemployment rate has dropped back to the 5% range.

Financial markets in most countries continue to anticipate lower-for-longer interest rates. Such a view is consistent with, and at least in part reflects, a future in which inflation trends below the levels seen in previous economic cycles.

The most pressing economic worry for central bankers and finance ministers is not how to contain inflation today or tomorrow, but rather what can be done to achieve even a moderate pace of economic growth over the medium term.

*Jock Finlayson is executive vice-president of the Business Council of British Columbia. This column is distributed by Troy Media in Calgary. Visit [www.troymedia.com](http://www.troymedia.com).*

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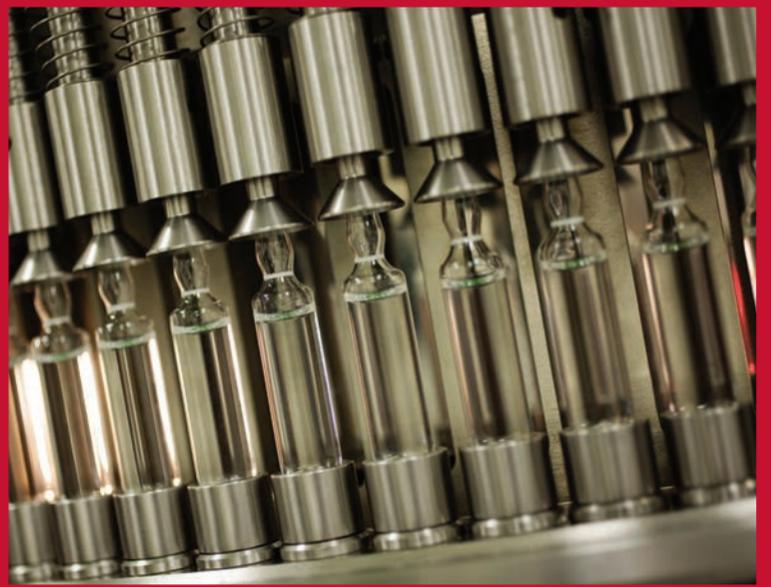
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