MAYEKAWA LEGACY RECIPS
40 YEARS RUNNING

ALTRA'S TRI-BUSHING
FLEXING IN THE HEAT

MAN, ABB COLLABORATION
ENERGY STORAGE SYSTEM

A KHL Group publication

COMPRESSOR TECH2

DEDICATED TO GAS COMPRESSION PRODUCTS AND APPLICATIONS

AUGUST-SEPTEMBER 2018 | VOLUME 23 | ISSUE 7

Turbine Specs-At-A-Glance

The Launch of TurboTides

Early Caterpillar Engines

War games

L.A. Turbine unleashes Ares

L.A. Turbine declares war against wires

Ares turboexpander features skid-mounted control system, PLC.

By **DJ Slater**

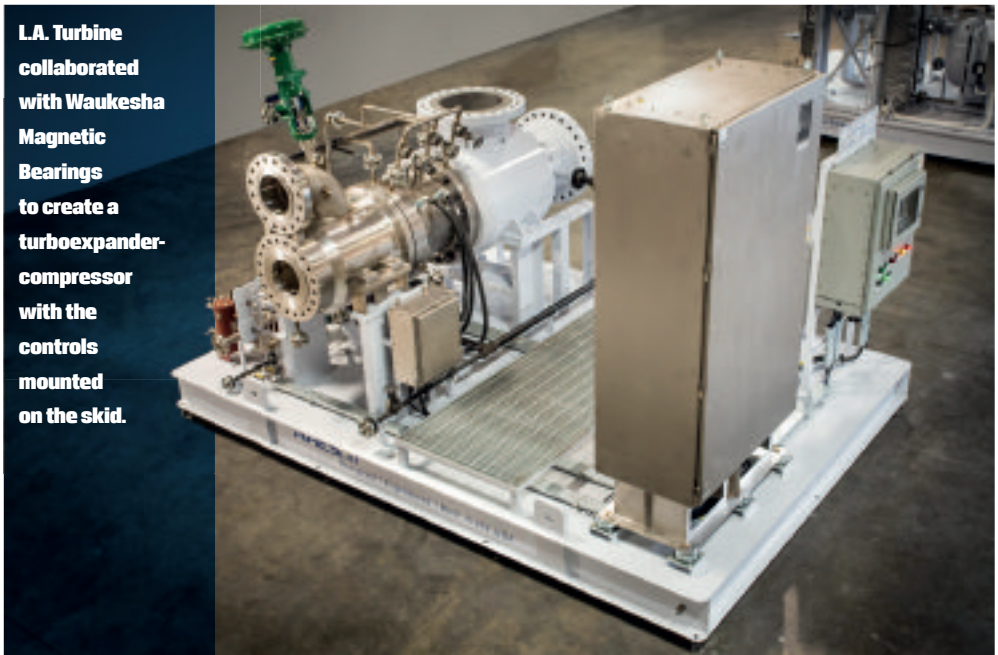
L.A. Turbine's Ares AMB turboexpander-compressor features a skid-mounted AMB control system and PLC control panel.

L.A. Turbine's new turboexpander-compressor doesn't have any strings to hold it down, an intentional move on the company's part to keep all the necessary connections and wires closer to the skid.

Instead of running wires from the turboexpander to its controllers in a separate building several paces away, the Ares active magnetic bearing (AMB) turboexpander-compressor features a skid-mounted control system and programmable logic control (PLC) panel. By placing these components on the skid, gas processing operators can have their turboexpander packages preconfigured ahead of time and ready to go once it lands onsite.

It's all part of L.A. Turbine's plan to make AMB-equipped turboexpanders popular and less costly for gas processing midstream applications, especially with the lure of fewer wires and components.

"We thought, 'Let's put the control panel on the skid and make the box safe for Class I/ Div. 2 areas,'" said Troy O' Steen, L.A. Turbine's director of sales. "We can do the tuning right on the skid within the shop, and when it goes to the customer, they are able to just push the start button."

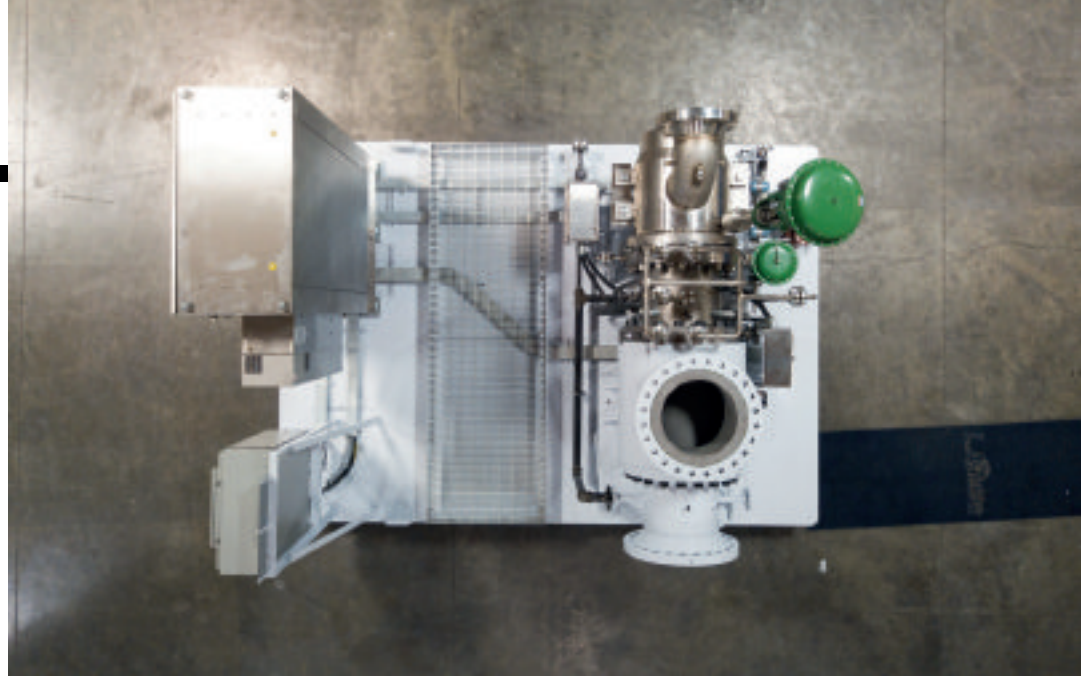

L.A. Turbine collaborated with Waukesha Magnetic Bearings to create a turboexpander-compressor with the controls mounted on the skid.

The genesis of the Ares AMB dates to July 2017. John Maskaluk, L.A. Turbine's owner, wanted to level the playing field for magnetic bearing technology in turboexpanders. While magnetic bearings in turboexpanders are not a new concept, the upfront costs overshadow the perks. Lack of operational knowledge across the industry, as well as longer delivery times, also made AMB turboexpanders less attractive against the same machines using oil-lubricated bearings.

Cutting wires

Bringing the price down, however, required design changes and L.A. Turbine's staff focused on one area that inflated the expense of AMB turboexpanders – cables and wires.

"Previously, from the turboexpander, you



had to run some expensive cables that go all the way to the control room," O'Steen said. "Those cables can run hundreds of yards and are very difficult to install."

Removing the cables negates the expense and complications that come from on-site installations, leaving customers with a simple piece of machinery designed for gas processing plant capacities ranging from 60 to 300 MMcfd (1.7 to 8.5 X 106 m^3/d).

"We spent a lot of time designing these AMB military connectors for quick connection and disconnection while eliminating the potential for human error for all processes," said Tadeh Avetian, L.A. Turbine's director of engineering. "We took 50 plus wires that had to land on the terminal block and we've consolidated that down to six plug-and-play connectors."

More flexibility

L.A. Turbine didn't craft this new AMB turboexpander offering alone. The company turned to Waukesha Magnetic Bearings to assist. The company provides custom-engineered magnetic bearing systems for turbomachinery and similar rotating equipment.

Waukesha Magnetic Bearings supplied the Ares turboexpander-compressor with its AMB hardware, as well as the Zephyr five-axis digital controller. The controller features a web-server interface and a built-in condition monitoring system for diagnostics. The controller has the capability for flexible packaging options, along with automated commissioning and retrofitting options.

The controller's diagnostic capabilities include event logging, trip data logging, automatic clearance check, transfer function measurement, spectra capability, harmonic capture and built-in tools that display compliance with ISO sensitivity performance criteria, according to Waukesha Magnetic Bearings. The typical temperature rating of the Zephyr controller is 32° to 104°F (0° to 40°C). With the air-conditioned cabinet featured on the Ares skid, the possible temperature range is extended from as low as -40° to 110°F (-40° to 43°C).

"Waukesha Magnetic Bearings has a different approach in how they design their control system," said Danny Mascari, L.A. Turbine's president. "They have superior control system technology with the compact design, hazardous area installation compliance, temperature operating range and open-source application that worked well for a skid installation."

The control system and panel also doesn't require Waukesha Magnetic Bearings to have someone on-site for troubleshooting, Avetian said. Instead, technicians can remote inspect the machine to ensure that everything is running smoothly.

If the lack of wires and a price point on par with oil machines isn't enough for Ares consideration, then the footprint and lack of ongoing maintenance should grab their attention, Mascari said.

With magnetic bearings as part of the turboexpander-compressor, plant operators don't have to worry about future expenses, as there are fewer moving parts to maintain compared to its oil-dependent counterparts.

"Our customers are very familiar with the lube oil machines, and when they stand next to this one, they realize how simple it is," Mascari said. "They realize how many points of failure have been eliminated and how many future maintenance costs (oil changes, filter changes) have been eliminated.

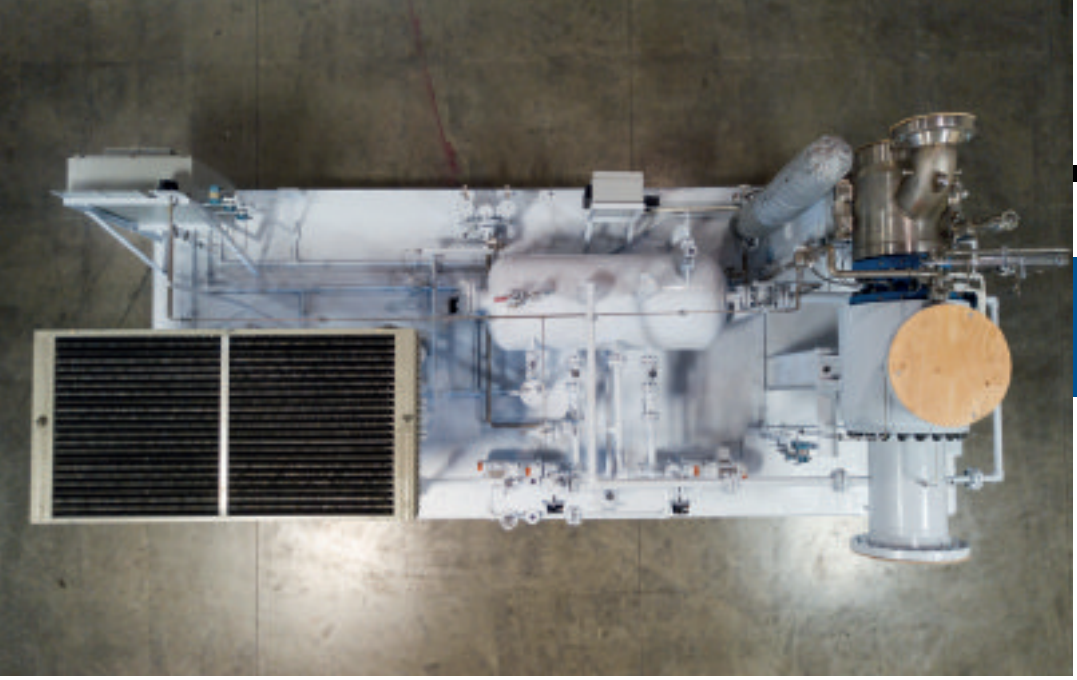
"Operators have known about the advantages of using magnetic bearings, but price was a barrier. Customers overlooked the total lifecycle cost of an AMB unit and focused on the initial investment costs," he said. "We can offer the Ares AMB at virtually the same investment price, and operators see future costs diminish due to the elimination of ongoing auxiliary system maintenance and operations. Operators can get the AMB advantage without paying a higher price."

Smaller footbrint

The Ares turboexpander-compressor also takes up less space than the oil variants. Because the magnetic bearings don't require a lubrication system on the skid, the Ares footprint takes up roughly 1/3 less space. Additionally, the AMB machine footprint does fluctuate in size the same way oil skids do

"Operators have known about the advantages of using magnetic bearings, but price was a barrier. Customers overlooked the total lifecycle cost of an AMB unit and focused on the initial investment costs."

DANNY MASCARI, president, L.A. Turbine



The Ares AMB variant (left) takes up 1/3 less space than its oil-dependent counterpart (right).

based on gas processing requirements, ambient temperatures or elevations.

For example, an oil-based turboexpander skid will differ in size depending on the specific needs of a gas processing plant, which extends the lead time needed to build it. The AMB skid size remains relatively consistent for gas plants. The only difference comes from the size of the turboexpander itself, but all the other components on the AMB skid remain the same, O'Steen said.

"It simplifies and standardizes the process from a design standpoint," he said.

So far, L.A. Turbine has two Ares AMB turboexpander-compressors committed to a customer at two different 200 MMcfd (5.7 X 106 m^3/d) gas processing plants. More are expected in the coming months, and the company expects to see the Ares apparatus not only in midstream applications. O'Steen said Ares has the potential to fit well within large downstream applications.

"A compact piece of equipment can make more sense from an operational and capital standpoint," he said. "The Ares AMB is a big return on investment for EPCs (engineering, procurement and construction) and end users on larger projects."

And with a name like Ares – the Greek god of war – L.A. Turbine hopes its message to the industry is clear: cables and wires won't hold back its latest product, and neither will larger competitors.

"We're a privately held business competing against the titans," Mascari said. "We're always willing to take a risk and build a product that makes sense for the market. We're willing to go to war." **CT2**