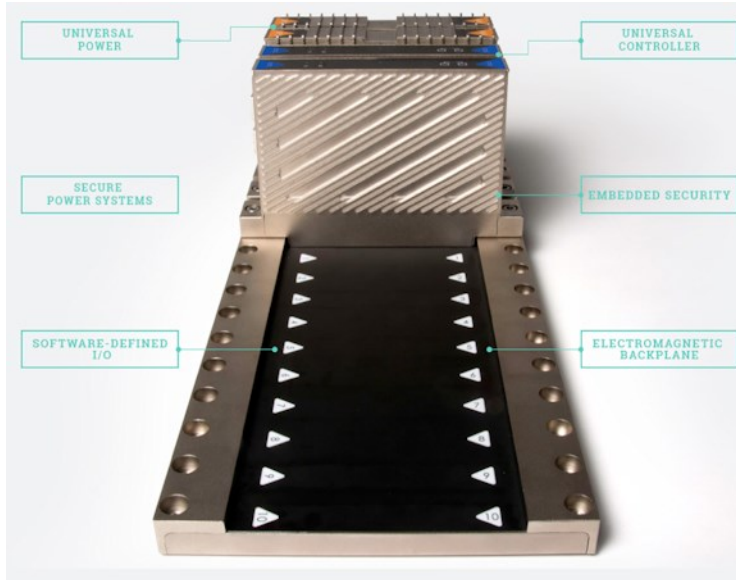


## Bedrock Automation Ships First Bedrocks

“PLCs haven't changed much in 20 years,” says Dee Brown of Brown Engineers in Little Rock, Ark. “Sure there are a few new communications ports and some programming features, but most of the change has been in driving the prices down. This has created a commodity market in the hardware space and frankly hasn't been too interesting. Bedrock's Open Secure Automation controller changes everything about the PLC space. With the system designed around cyber security from the ground up, that's a game changer.” Brown is a system integrator and one of the beta testers for the Bedrock Automation controller, the “Bedrock™”.



Bedrock's controller looks very different from other PLC/DCS controllers.

About a year ago, the *INSIDER* started writing about a totally new controller concept that had come from outside the automation industry... from a group of Silicon Valley engineers at Maxim Integrated, a large semiconductor manufacturing firm. It turned out that several of the team had some automation background, particularly Albert Rooyakkers, CTO of Bedrock, who was one of the developers of the IA-Mesh at Foxboro a generation ago. Rooyakkers has been working on the mesh concepts he pioneered ever since.



Bedrock CTO Albert Rooyakkers

Like Inductive Automation and several other “new” automation companies, Bedrock Automation is a destabilizing actor. Their intent is to shake up the market, and if the reaction to their first set of products is any example, they've done their job well. Bedrock's controller is the first new control system to be completely designed from the blank sheet of paper out.

“Bedrock is the first unique platform to enter the control market in



Chris McLaughlin, Vertech

the last 15 years. It diverges radically from the typical platforms and is superior in terms of processing power, redundancy, scalability, security and cost efficiency. We plan to use it as a point of differentiation for our business,” says Chris McLaughlin at CSIA integrator firm Vertech Industrial Systems.

Just how radical is the divergence? It starts with the backplane. Drawing on Rooyakkers' years of mesh networking expertise, Bedrock delivers I/O, power and communications across the pin-less electromagnetic backplane with a parallel architecture that supports ultra fast scan times regardless of I/O count. The removal of I/O pins improves reliability and increases cyber security while forming a galvanic isolation barrier for every I/O channel. This massively innovative backplane also allows installation of I/O modules in any orientation and location for unprecedented flexi-

bility in I/O and cable management. Additional cyber security layers include:

- A real-time operating system with the highest safety (SIL 4) and security (EAL6+) rating of any RTOS available today
  - Cyber secure microcontrollers with encrypted keys and TRNG embedded in all system modules, including the controller, power supply, and I/O
  - All modules encased in anti-tamper metal that is impenetrable without metal cutting tools
- Authentication extending throughout the supply chain, including third party software and applications

Even the power supply is encrypted for cyber security.

Okay, so it is cool. But what do the users say?

Dee Brown, who has started to use the Bedrock in his proposals, says, “My first conversation was from a manager of a city-owned utility of electric, water, and sewer service and he said, ‘Yes, we need that. The government is only going to get more stringent with regulations to protect the grid.’ So we are budgeting Bedrock controllers for all of his substations right now. Every utility manager and board member is



Dee Brown, Brown Engineers

## Bedrock Ships Bedrocks (continued)

going to want this product so they can assure the citizens that they have taken every precaution to protect their infrastructure; water, sewer, electric grid, industrial, and so on.”

According to Kris Grindstaff, a senior integrator with Vertech, the most important features of the Bedrock are, “The Black Fabric connection between the IO cards and the backplane. No connectors or pins to get bent or damaged is a real plus. I also was interested to see the built in security and encryption in the system. It was built with security in mind instead of added later.”



ARC's O'Brien

According to ARC's Larry O'Brien, “Adding so many layers of protection to a conventional DCS, SCADA RTU, PAC, or PLC would add

cost and complexity and degrade performance. With Bedrock, they were built in from the start.”

“The weakest feature is the lack of a 20-year installation base. I guess all the major controllers had to be new at some point. I am comforted by the 3 years of testing that Bedrock has done, and by the robust quality of the product.” — Chris McLaughlin

has done, and by the robust quality of the product.”

Bedrock says their pricing is competitive with other systems of the same quality and specifications. The controller is selling for approximately \$20,000.00. Dee Brown notes, “The only complaint people might make is the initial price, but that all depends on your perspective and what kind of hardware you have been purchasing. If you look at a comparable controller for speed, I/O, and control power, you will find

O'Brien goes on to say that Bedrock supplies, “A secure universal controller reportedly is so powerful it can run virtually every conceivable application independent of size or control task: discrete, batch, continuous, or multivariable control from one device that supports as few as ten, to as many as thousands of I/O points. No longer are separate programmable logic controllers (PLC) and distributed control systems (DCS) required.”

Talk about destabilizing! It was fascinating to watch, at the ARC Conference in Orlando this past February, as the M&A executives from all of the major automation companies walked by, drooling on the Bedrock designs. There have been some negative comments in some forums, but the system exhibits such excellent design values that there really hasn't been a lot to complain about, and there won't be until after there are some Bedrock systems installed for a while.

Does the actual controller once received match the marketing hype? Chris McLaughlin says yes. “The product is real, and I don't believe that it has been overhyped. The Black Fabric backplane, virtual marshalling, universal power supplies, and integrated OPC-UA server are all revolutionary features. The product is built rock-solid and you can feel the quality of the manufacturing. All of our engineers were impressed by the processing speed. Well done Bedrock.”

Grindstaff notes, “I would say the strongest feature would be the processing power and built in security. I also like that the processor itself can be an OPC UA server. Without actually using the controller in a real project it is hard to say what the weakest feature would be. I would say of the entire system I find the programming software to be the weakest.”

McLaughlin says, “The weakest feature is the lack of a 20-year installation base. I guess all the major controllers had to be new at some point. I am comforted by the 3 years of testing that Bedrock

that the price is very competitive. But the best part is you get the cyber security features as well.”

The biggest negative, according to the users, is the programming software. In order to get the product to market, and operate in a standards-based framework, Rooyackers and his team decided early on that they would use standard, commercially available programming software (CoDeSys) and a commercially available HMI/SCADA package (Inductive Automation's *Ignition* product). McLaughlin says, “Our engineers are comparing the CoDeSys programming software to programming environments that have gone through 20 years of updates and improvements. Everyone on our staff agreed that CoDeSys is fine and they will not have problems completing a project. On the other hand, there are some bells and whistles that they would like to see added to the software.”

What makes Bedrock important, beyond just the product itself, is the fact that a company was able to move into the automation industry and in three years become a force to be reckoned with. This is not the only time we should expect to see this in the future.

We can expect many more such destabilizing actors to enter the market, and we can expect them to produce significant changes, and to force the major automation players to make changes, in design, in construction, in quality, in service—in short, in just about every area. Customers can really expect to see suppliers turning backflips as the destabilizing actors affect their business.