TRI-SEN
TURBOMACHINERY CONTROLS

PODCAST EPISODE TRANSCRIPTION

Episode Summary:

In this first-of-three episodes, Tom Bailey and Jim Jacoby (VP of Technology at Tri-Sen) discuss integrated turbine control. Specifcally, what it is, who it benefits, and how.

Tom Bailey: Hi, and welcome to the Turbomachinery Controls Podcast where we'll be informally discussing turbomachinery controls and turbine safety-related questions and topics. Opinions expressed here are our own and not necessarily those of Tri-Sen. I'm Tom and I'm with Jim Jacoby, Vice President of Technology here at Tri-Sen.

Jim Jacoby: Hey, Tom.

Tom: Hey, Jim.
In this episode, we'll be talking about integrated turbine and compressor control, or integrated gas turbine and compressor control, or integrated motor and compressor control. So let's get started like we usually do with a question. What exactly is an integrated controls solution?

Jim: Yeah, so if you look back in the history of the integration, it started with the gas turbine controls and the earliest gas turbine controls that were analog-electronic just for doing the speed control and then a lot of relays.
With the development of PLC technology, it became, I guess, just natural to try to use one platform that could not only do the digital on-off logic but also manage the speed of the machine and maybe some other control features. And that probably was driven by the communication issue.
The early systems had lots and lots of IO just for communicating between the sub-components of the system. So, getting rid of all that IO was possible once you moved everything into one platform because - then, you wouldn't need all those extra wires, inputs, and outputs. So integration probably picked up quite a bit in the '90s. I think the biggest challenge in the turbomachinery world, technically, has always been some of the special IO that you need.

Tom: And that is the speed side of it, right? As opposed to...

Jim: Well, speed... [in addition] in the power business, you needed something to interface to the servo valve. If you intended to use high-pressure hydraulics. Even in the industrial or mechanical drive systems, because so many of the early actuation systems were based on the Woodward gadgets that needed the higher current.

Tom: Now, was that integrated into the PLC, or was that a standalone interface though? Like an SPC or what we call a DSC? A Digital Servo Controller or Tri-sen product [like] the M305 and 306?

Jim: I believe Woodward had some products that integrated the high current output but even Triconex developed an interface for some of those Woodward gadgets though.

Tom: Right. Now on the compressor side, the IO is pretty...

Jim: Yes, it's just industry-standard. Well, remember, for forever all we had was pneumatics, right? So there was not anything special for compressors. And the one thing that probably kept people from using the DCS for turbomachinery controls was the speed of execution.

Tom: Yeah, so just to be clear on this kind of small issue. This idea of integrated turbine generator control and integrated turbine compressor control. I think for me, integrated turbine compressor control sounds legitimate. When we start talking about the generator though, there is still a boatload of stuff that isn't integrated into the PLC, right? All the generator control relays and stuff like that. All that is typically separate, right? You buy a separate Basler to do that interface.

Jim: That is still done, but on the other hand, there have been some manufacturers that have integrated both the speed control, the voltage regulation, and the synchronization control. Things like that.

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Jim: I am not sure how well that has caught on yet because of people like Basler that have such a good solution that is not very expensive. But I think for the biggest machines, you know, the integration has started to make sense because of the redundancy that they are trying to work with, you know, with the cheaper systems, you don't have any redundancy.

So anyway, I was just kind of laying some foundation here. That is still not the integration of the driver and the driven equipment, but that's kind of where the idea is started. And so moving into an integrated solution between the driver and the compressor really starts to become a lot easier, unlike a generator which still has a whole bunch of subsystems that are tougher to deal with.

With a compressor, it's just some more PIDs and a little more IO and you have what you need. You have the ability to do a little fancier control, especially for performance control.

So if you want to manage the process using both the speed control or suction throttling and say your anti-surge valves, it's a lot simpler when [everything] is all in one platform instead of having to provide a bunch of handshaking between two different platforms.

Tom: Right. Now, are you talking from the viewpoint of the integrator or the end-user in that respect?

Jim: Both would benefit.

Tom: So for maintaining separate databases and that kind of thing that you get into...

Jim: Yeah. HMIs and you know, it goes on and on.

Now, that is a good point. What is a benefit to the system integrators may not come through as a benefit to the end-user but in this case, both would win. [For example] typically, if you buy a system that has one manufacturer for the compressor controls and another manufacturer for the speed controls, you are going to get two different user interfaces.

That doesn't stop you from bringing the data together into one user interface, but for maintenance and other things like that, they are probably going to be separate and now your plant technicians have to know two different systems to deal with it. You know, it compounds.

Tom: Okay, so can you give an example of a specific integration benefit?

Jim: It's not unusual on a compressor, you are going to control the suction pressure, right? So if your performance control is in a separate platform, you need a pressure transmitter to cascade pressure controller output to the speed controller. The surge controller needs that suction pressure as well for surge control. So you either got to have two different transmitters or you've got a wire between them. Either way, if that is in one platform, you are covered. Or, if you do have two transmitters, now you can do a redundancy scheme.

You can actually get more benefit from that second transmitter than just to have a way of getting the data to two different boxes.

Tom: Okay. Well, there it is then. That's it for this episode.

Drop us an email at turbomachinerycontrols@tri-sen.com, and let us know what you got on your mind. Thanks for listening. We'll see you next time.

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