In an exclusive interview with IAA,
Martin Rostan, **Executive Director,**
EtherCAT Technology Group (ETG), tells
Goh Tz'en Long **about the advantages of the**
real-time industrial Ethernet solution.

▶▶▶in Real Time

What pioneering developments at Beckhoff led to the formation of the ETG?

Beckhoff is one of the pioneers of PC-based control originally and you know that PCs don't come with I/O, there is no backplane bus or I/O. Of course ISA and PCI buses have a limited number of slots, and fairly expensive technology so from the early beginning of PC-based controls, there was a need for fieldbus extensions to be able to hook up I/O to the industrial PC and at the time Beckhoff started working on this, there was no fieldbus available, and Beckhoff developed one fieldbus at that stage, which was born in 1989, called Lightbus. And lightbus is a fibre optic bus system which already employs the same functional principle as processing on-the-fly, a technology that is also used in EtherCAT. So for years, Beckhoff has been looking at what is called next generation lightbus, or fast lightbus. And there were ideas to improve the performance of lightbus. You know, up til now, lightbus is still one of the fastest fieldbus systems around. There was the need for getting more performance, and then when Ethernet emerged as a new standard for industrial controls as well, basically that was the breakthrough idea to combine the principle of lightbus with the Ethernet principles. Because Ethernet has a pretty good acceptance in the industry, is fast and there are low cost components available for Ethernet. So it was a natural choice to do this.

Can you share with us your involvement and role in the ETG?

Well, I am the Executive Director and also the Chairman of the Board of Directors of the EtherCAT Technology Group, so I am working at the ETG office back in Nuremberg. Of course, my job is to run the organisation and to promote EtherCAT worldwide. I am also involved in international standardisation, so I am part of several IEC and ISO committees, where the EtherCAT standardisation is taking place.

How many members are there in the ETG and what are the membership profiles?

We have, as of Friday evening (Nov 3), 389 members internationally. ETG turns three years old in November. In the beginning, obviously since Beckhoff invented this, it started with Beckhoff users to be the first group of companies. But then it very quickly spread out, first to Europe of course, coming from there. I would say year one was more or less Germany and Beckhoff users abroad as well. Year two was very much the automation industry, so almost all vendors of servo drives, servo motion

In Singapore with ETG partner: (l-r) Wan Chon Kong, Manager, TDS Technology; Vincent Tan, Managing Director, TDS Technology; Martin Rostan, Executive Director, EtherCAT Technology Group; Paul Yeo, Director, TDS Technology (Thailand).

controllers, controllers in general, sensors and so on. So lots of automation vendors joined in year two. This is very generalised, of course it was moving in other ways as well, but year three saw the globalisation of the ETG. And this was partly the strategy as well. 2006 is the first year that ETG went global, with trade shows in Asia, as well as the US and all over Europe. So we actively went down the path and we found a lot of new members from abroad. End users like Samsung joined the ETG. Interestingly enough and particularly in Japan, there is a lot of activity right now. We have companies like Hitachi, Sanyo Denki, Fuji Electric, who are active members and we held the first EtherCAT training class in Tokyo in October, so we find that its really worked out to become a global organisation.

Can you tell us about the advantages of EtherCAT?

EtherCAT is a technology which has a number of unique selling points, and a pretty unique combination of those. We are considered the fastest industrial Ethernet by a big margin. We are at the same time, the only real-time industrial Ethernet technology that does not need a special plug-in card for the master, which makes it very cost effective for implementation because all you need, is an Ethernet MAC, no coprocessor, no special cards, not a lot of processing power at all. We don't need switches or hubs and we have very low cost slave controller chips available, which makes it a very low cost technology. And the third unique selling point is the topology, since we support not just the star topology, but line topology without any limitation on the number of nodes in the line. Everybody else claims that they do line topology but when you ask, they say maybe 10, maybe 20 nodes and you have too many cascaded switches in between, which is not the case with EtherCAT. So we can do droplines, we have redundancy, tree topology and very long distance. So we see quite a few companies and industries endorsing EtherCAT simply due to the topology advantages. And it is a truly open technology which you will find if you want to implement a master. In my eyes, the key question about openness is: Do you really have access not just to implementing a slave, but a master as well? And it can be shown that EtherCAT does provide this.

Can you tell us about the range of EtherCAT master products currently available?

There is master sample code by Beckhoff which can be licensed at a nominal fee and integrated in your own product, but there are many other companies providing master code as well. Meanwhile there are two open source EtherCAT master implementations downloadable from the internet so you don't even have to pay for it. In trade shows, at the joint ETG booth, you will see a large variety of EtherCAT masters on display, using about 10 different operating systems so far. You can see that the choices are wide and deep as well. So it is not just five different Windows implementations but also the entire range of real-time operating systems, CPUs and vendors providing master implementations.

How about slaves?

More than 200 slave development kits have been sold so far. At the ETG booth over 40 companies show more than 90 different products, ranging from drives, I/O, sensors, pneumatic and hydraulic valves, HMI, to semiconductors and interface cards for simple device integration.

How different is EtherCAT's application layer implementation?

We try not to reinvent the wheel if it is not necessary, so we are using well-established device profiles for our devices. One device profile family that is supported by EtherCAT is known as CANopen. CANopen provides a wide range of device profiles ranging from I/Os, hydraulic components, user interfaces, sensors and optical drives. The other device profile (family) that we support is known as SERCOS and it is standardised in the same IEC specification that EtherCAT is part of, as a transport layer for that SERCOS device profile, so the ones familiar with the SERCOS IDNs, look and feel, the tools and so on, will find in the EtherCAT world, the same user interfaces and parameters for the drives. **ia**