

Automation technologies: a strong focal point for our R&D

Automation is an area of ABB's business with an extremely high level of technological innovation. In fact, it may be seen as a showcase for exhibiting the frontiers of development in several of today's emerging technologies, like short-range wireless communication and microelectromechanical systems (MEMS). Mechatronics – the synthesis of mechanics and electronics – is another very exciting and rapidly developing area, and the foundation on which ABB has built its highly successful, fast-growing robotics business. Robotic precision has now reached the levels we have come to expect of the watch-making industry, while robots' mechanical capabilities continue to improve significantly. Behind the scenes, highly sophisticated electronics and software control every move these robots make.

Throughout industry today we see a major shift of 'intelligence' to lower levels in the automation system hierarchy, leading to a demand for more communication within the system. 'Smart' transmitters, with powerful microprocessors, memory chips and special software, carry out vital operations close to the processes they are monitoring. And they capture and store data crucial for remote diagnostics and maintenance. The communication highway linking such systems is provided by fieldbuses. In an ideal world there would be no more than a few, preferably just one, fieldbus standard. However, there are still too many of them, so ABB has developed 'fieldbus plugs' that, with the help of translation, enable devices to communicate across different standards. This makes life easier as well as less costly for our customers.

Every automation system is dependent on an electrical network for distributing – and interrupting, when necessary – the power



needed to carry out its various functions. Here, too, we see a clear trend toward more intelligence and communication, for example in traditional electromechanical devices such as contactors and switches. We are pleased to see that our R&D efforts in these areas over the past few years are bearing fruit.

Recently, we have seen a strong increase in the use of wireless technology in industry. This is a key R&D area at ABB, and several prototype applications have already been developed. At the international Bluetooth Conference in Amsterdam in June 2002, we presented a truly 'wire-less' proximity sensor – with even a wireless power supply. This was its second major showing after the launch at the Hanover Fair.

Advances in microelectronic device technology are also having a profound impact on the power electronics systems around which modern drive systems are built. The ABB drive family ACS 800 is visible proof of this. Combining advanced trench gate IGBT technology with efficient cooling and innovative design, this drive – for motors rated from 1.1 to 500 kW – has a footprint for some power ranges which is six times smaller than competing systems. To get the maximum benefit out of this innovative drive solution we have also developed a new permanent magnet motor. It uses neodymium iron boron, a magnetic mate-

rial which is more powerful at room temperature than any other known today. The combination of new drive and new motor reduces losses by as much as 30%, lowering energy costs and improving sustainability – both urgently necessary – at the same time.

These innovations are utilized most fully, and yield the maximum benefit, when integrated by means of our Industrial IT architecture. Industrial IT is a unique platform for exploiting the full potential of information technology in industrial applications. Consequently, our new products and technologies are Industrial IT Enabled, meaning that they can be integrated in the Industrial IT architecture in a 'plug and produce' manner.

We are excited to present in this issue of *ABB Review* some of our R&D work and a selection of achievements in such a vital area of our business as Automation. R&D investment in our corporate technology programs is the foundation on which our product and system innovation is built. Examples abound in the areas of control engineering, MEMS, wireless communication, materials – and, last but not least, software technologies. Enjoy reading about them.

A handwritten signature in black ink that reads "H. Jork, Bayegan". The signature is written in a cursive, flowing style.

Markus Bayegan
Chief technology officer