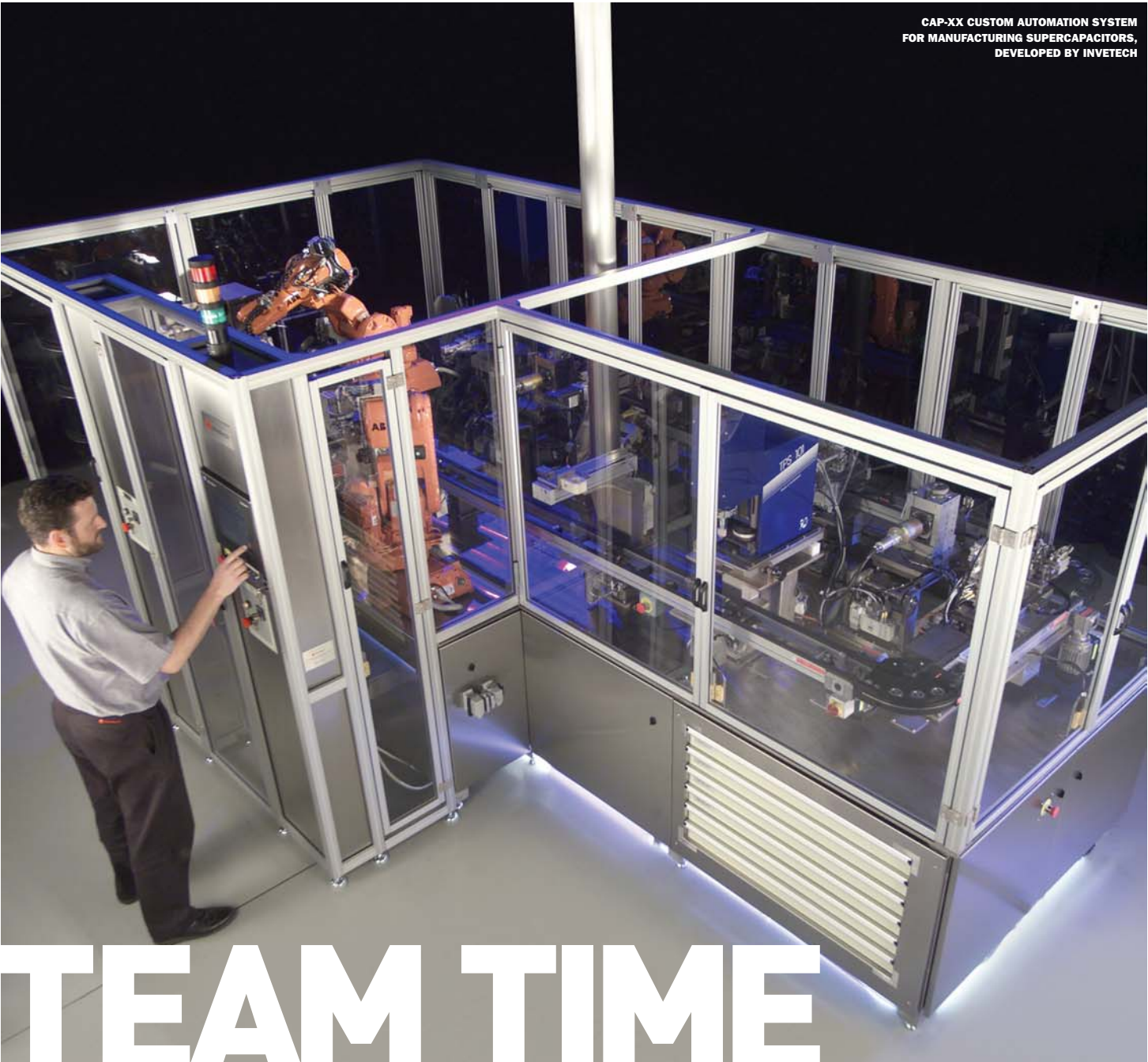

CAP-XX CUSTOM AUTOMATION SYSTEM FOR MANUFACTURING SUPERCAPACITORS, DEVELOPED BY INVETECH

TEAM TIME

CONSULTATION AND COLLABORATION ARE THE KEY FEATURES OF INVETECH'S SEASONED APPROACH TO PRODUCT AND PROCESS DEVELOPMENT. TIM MENDHAM REPORTS

Whether it's building the better mouse trap or developing the better mouse – let alone improving the way the world operates – the concept of the lone operator has largely moved into the mists of history.

"There are very few projects that one person can do alone," says Bill Hill, director of the Product Innovation group at Invetech.

This means that collaboration and cooperation as much as inspiration and perspiration are the key terms of modern product and process development. The "secret sauce" for developing breakthrough new products combines equal parts of innovative and systematic design and engineering.

Invetech has had 30 years of practice in this area, working globally on over 5000 projects that have delivered more than a billion dollars in value for Invetech's clients. The company offers a range of services which it summarises as "consult – design – build", and these can range from fast-moving consumer goods through custom automated industrial machinery to high technology biomedical equipment. And that includes, as it happens, a better mouse trap.

More than 80 per cent of its business comes from international companies based in the USA, Europe and Asia, with many of the products it has designed and developed ultimately

transferred for manufacture in South East Asia, China and Mexico.

The mouse trap project, as apparently simple as it seems, is actually a good example of how the company operates.

"We regard ourselves as complementary to our client's own technological ability," Hill says. "With the mouse trap, the client [Mortein/ Reckitt Benckiser] had a deep understanding of what consumers wanted and we did the trap."

That project drew on a range of skills within Invetech that exemplifies the team approach: industrial designers, mechanical engineers, and manufacturing engineers, complemented by client specialists, such as animal physiologists.

"Our internal people always work in deep consultation and collaboration with the client," Hill says. "The client knows the market best. In this case, the overriding requirement of the trap was a 'no see – no touch' result for removal of the captured mouse. That, and a strong focus on design for minimum cost to achieve ultra-low materials and labour costs.

On the other end of the scale, many projects cover much more than purely design aspects.

The project on behalf of Sydney based electronics manufacturer Cap-XX involved not only a range of soft-pack designs for the company's super-capacitor technology, but also the development of a entire custom automation system for manufacturing the product.

This meant that the total consulting package covered:

- product design, suitable for high volume, low cost manufacture
- development of a production process for manufacture
- development of flexible, low volume, low cost pilot manufacturing equipment for on-going product development, market research, and process optimisation
- creating a manufacturing strategy to enable scale-up from initial R&D and pilot production, through to high volume manufacturing in multiple countries
- developing, sourcing and integrating high volume fully-patented manufacturing equipment, and
- replication of this equipment for off-shore contract manufacturing.

"We worked closely with the Cap-XX scientific team to develop these solutions," says Hill. "Product design and chemistry development moved forward hand-in-hand. Innovative use of barrier films provided the moisture and oxygen barrier required, and now-patented techniques for interconnection of cells and terminal egress were developed."

Invetech says this is indicative of a structured ideation process it has developed that ensures it focuses on the challenges that are important to its clients. Once it has defined the core challenge, it draws on the appropriate creativity tools and focuses its creative abilities on generating innovative solutions to meet clients' commercial needs.

"We share our innovation tool kit with our clients, and wherever possible involve them in the entire innovation process," says Hill. "There are many touch points with the client in any one week, and personnel from the client often work with us for short periods of time."

Invetech typically provides a client with a range of technical solutions to its particular problem. On top of the technical solutions, Invetech also evaluates commercial criteria, providing guidance on benefits versus cost.

"Commercial awareness has been in the company's DNA since our creation in 1976," says business development manager, Alan Morris. "We put a lot of emphasis - backed up by detailed training of our people - on business and consulting issues on top of developing their technical abilities.

"It can be hard to find technical people with a business sense, and it's often a real eye-opener for them when they come to see things from the client's perspective, but that's a vital part of the way we operate. We work hard to 'de-jargonise' everything. In our requirements and product definition documentation we always offer clients technical information with commercial elements, benefits and outcomes implicit in the overall scheme."

Bill says that personnel selection and Invetech's culture are critical to the consultative and collaborative process it has developed.

"Our process is transportable, it works across different industries and projects, although obviously the details vary from client to client and project to project. You do need to understand the context of client and the project, which means you need to understand how it will work and how the client will make money in the real world. Which is why we draw on various skills – both internally within Invetech and externally within the client – across any project."

Having a transportable process is important to being responsive, bringing new products to market faster. Also important is a collaborative approach to the intellectual property that Invetech creates.

"We have a fairly simple rule – the person who owns it is the person who pays for it."

For instance, in the case of the extensive and complex Cap-XX project, all intellectual property created as a result of the project, both design and equipment oriented, was assigned to the client.

"Our clients bring deep domain knowledge about their market, their customers and the core technology that they want to take to market. We bring expertise in innovation, product development and cross-pollination from our broad industry and technical knowledge. The combination enables us together to embody the client's core technology in innovative new products that take market share, meeting their customer's needs with a benefits versus cost value proposition that is superior to competitors."

Each solution is a bespoke outcome, tailored for the individual client through a truly collaborative and team-oriented process.

SYSTEMATIC INNOVATION PUT TO THE TEST

Traditional innovation follows a somewhat unstructured approach and generally full of pitfalls. Typically, when faced with a problem, you brainstorm; you filter; then you realise most of your ideas are worthless because you haven't addressed the real issue. Often, assigning a project manager, who subconsciously guides the process, will counteract this set back. However, in growing organisations where innovation is your business, finding enough project managers with the required level of capability is challenging - so you need an innovative solution.

At Invetech, we put together an innovation team to assess the capabilities of systematic tools in providing consistency in innovation quality. We focused on the use of the TRIZ toolbox (The Theory for Inventive Problem Solving).

How did we go?

Our success can be best illustrated by one of several case studies we evaluated.

In one study we were faced with the need to use specialist and expensive valves. Thirteen valves were used in the system, accounting for more than 30 per cent of materials costs. At this cost, the product was not viable. Traditional brainstorming forced us down a path of replacing the valves with alternatives or reducing cost. When we applied tools from the TRIZ toolbox, we realised that the valves were in fact added to the system to solve a more important issue.

The primary rule of TRIZ is to tackle the problem at its core before diving into the detail (referred to as the supersystem level in TRIZ terminology). By tackling the problem at the supersystem level, we realised we had a far better solution - eliminate the valves altogether. To achieve this, all we needed to do was change the system architecture.

OK, so it did take 6 months and $500,000 to do that, but the final product was far more innovative than what we started with, and more importantly, commercially viable.

Ashraf Abdelmoteleb, Innovation Team Leader, Invetech