

Innovation

Created in 2007, Cambridge Pixel develops primary radar acquisition, processing and display solutions. It supplies its software-based SPx radar scan conversion solutions to BAE Systems Mission Systems, for deployment on the Royal Navy's Type 45 Destroyers and the Queen Elizabeth Class (QEC) aircraft carriers.

Mission Systems has integrated the SPx solution into its command and control client software. This enables multiple source radar video to be received into a server application and distributed over ethernet networks to command and control displays across the ship.

Brian Page, Chief Technical Authority for the CMS-1 Combat Management System product at Mission Systems, said: "We chose Cambridge Pixel's solution because of their advanced software solution and flexible product architecture."

"Cambridge Pixel's expertise in radar display systems has been a great asset to our programme."

The strong relationship between Mission Systems and Cambridge Pixel offers many benefits to both parties and the Royal Navy. Cambridge Pixel is adept at enhancing its product to meet any requirements. This flexibility allows Mission Systems to mix and match elements from its in-house development to decide upon the optimum solution for the customer. At Transmission's invitation, Brian and David Johnson, Managing Director, Cambridge Pixel, recently met to discuss the value in their partnership.

David, can you tell us about the origins of Cambridge Pixel?

We started business in early 2007, recognising there were changes occurring in the computing industry. Modern technology enabled us to provide software solutions for radar displays where previously, special purpose hardware had been needed.

We generated a software-based solution for radar display applications and provided it in a way that system integrators could incorporate into command and control consoles. The objective was to deliver a more flexible, cost-effective solution. As a new company with new ideas, and a passion for what we were doing, we were keen to make it work.

Brian, how long has Mission Systems been working with Cambridge Pixel?

We first spoke to Cambridge Pixel in late 2007. The market was changing and the area in which Cambridge Pixel provides capability was something we had been monitoring for a long time.



Above: Brian Page (left) and David Johnson

The right product at the right time

Specialist software company Cambridge Pixel helps Mission Systems deliver enhanced capabilities while reducing lifetime costs. Transmission finds out more

In the early 2000s, we moved our combat management system (CMS-1) into commercial-off-the-shelf (COTS) technology, but for radar video distribution and scan conversion we were still dependent on bespoke hardware solutions.

Around that time, Cambridge Pixel was formed. We agreed to have a look at their product, evaluate it and assess the company itself, before doing some prototyping. We carried out due diligence to ensure we weren't exposing ourselves to any increased risk by working with a small company.

David, what are your core skills and who are your key customers?

We combine skills and experience in sensor processing. We have been involved in radar video processing, distribution and display for more than 15 years, covering many large-scale programmes in that time.

We have a thorough understanding of the problem, the technical issues and environment, and specialist software skills that allow us to deliver an effective solution. The combination of our application knowledge and specialist software skills gives us a unique position.

Our products are relevant wherever people are using radars. We're probably 70 per cent military-orientated but are seeing radar become more prevalent within security applications, asset protection and oil rig protection. Our products are increasingly becoming part of the solution in

these areas.

Mission Systems is an important local customer, but as a niche company, we necessarily have to sell worldwide. We're seeing an increase in overseas business, making progress in India, Korea, North America, South Africa and Taiwan.

We're also starting to see some progress in France and Germany. We have to have a global scope because of the specialist nature of what we do.

Brian, what was the factor that led Mission Systems to work in partnership with Cambridge Pixel?

Timing; they had the right product at the right time. They presented the transition from bespoke hardware to COTS graphics cards and processors to market at the right time.

We were looking at seven-year support contracts for the Type 45 Destroyers and had a real drive to reduce through-life costs. We'd moved much of our system over to COTS technology. The hardware-based elements for radar video distribution and scan conversion were among the last to make the transition and were key cost drivers for our system. The pieces fell into place in terms of the market being there.

The decision to change and take on the risk to move to a software-based solution was a good one. There was both financial incentive and a natural progression towards COTS solutions. We were therefore

able to convince the customer that the change would be beneficial to them and also for BAE Systems.

David, what is your unique selling point?

Freedom. We heard from many people that they didn't want to be locked-in to a particular proprietary solution or be required to purchase a whole set of hardware from one particular supplier. They wanted the freedom to be able to choose hardware and software independently. In some situations, that choice, that freedom, was being denied to the system integrator. Our approach was to be flexible open and modular, recognising that customers like Mission Systems want to add their own value, contribute their own software layer. Having mutual import from both sides is also a distinguishing feature.

Brian: Can I add to that? As a company that develops a lot of software, we had had some challenges with the integration of the hardware-based solution.

In effect, it was a black box to us. We had quite a laborious process of having to work with a sub-contractor in terms of understanding and resolving issues.

Combining Cambridge Pixel's software with our own gave us much more flexibility with our integration approach. We could diagnose problems more easily and the work also created a stronger bond between the

two companies. Cambridge Pixel was very supportive in the early stages, helping us find the right way to integrate their software into our existing product.

Brian, how does Mission Systems use Cambridge Pixel's software?

There are two areas. The first is into the radar video servers, taking video, compressing it and distributing it around the system.

The second area is in the consoles themselves. They receive the compressed video and form a layer which is combined with the tactical picture and charts, and anything else that is on display on the CMS-1 console. We've got that on the Type 45 Destroyers and are developing it for the QEC Aircraft Carriers. We're also looking at the Type 23 Frigates, command system and export products. We're taking this on wholeheartedly and are moving it forward.

How does the partnership anticipate and evolve technology refresh?

David: In one sense, our solution makes technology refresh inherently easier. It's very cleanly de-coupled the hardware platform that runs the processing and graphics from the software that is supplied, in part, by Cambridge Pixel and Mission Systems. As it's PC-based technology, it will evolve, get faster and offer more capability. The ability to separate the software from the hardware and refresh the hardware independently is a major step forward.

Where there is proprietary hardware, special hardware that is developed for radar display for example, you've got a much tighter coupling between software and hardware. In that situation, technology refresh could be a little more difficult.

Brian: I'd go along with that. Within our support contracts for CMS-1 on the Type 45s and DNA(2) on the Type 23 Frigates, we have a joint support solution approach whereby we have a biennial technology refresh. On each particular ship, the technology is refreshed every four years and we're doing half the ships on each drumbeat.

When we started looking at Cambridge Pixel's software, one of our concerns was the performance of the hardware. We're going back to a time when we were using PC technology on the ships that was from 2005, before technology refreshes were up and running. We'd delivered some kit to the Type 45s some years before and had occasional performance issues, so we had some nervousness about taking this on within the technology we were using at the time.

We undertook initial work just to see if we could run Cambridge Pixel's software on our console because that was primarily our pinch point in terms of processing.

It was just about possible on the technology available in 2009 and that was the springboard we needed to move things on. Now there is no hard tie between the technology, the hardware and software solution are two independent streams.

We will always look for opportunities and some have already been identified on platforms where we may unlock some of the capabilities within the SPx 100 software that we're not currently employing.

Feedback from customers suggests there may be some encouragement to enhance the solution to provide a better capability on the ships. This would have been quite painful and laborious and potentially costly with our previous supplier.

With Cambridge Pixel, we can have a much more open discussion and potentially, the capability may already exist within the software modules already provided.

The software itself is more capable

than the area in which we're currently using it.

Brian, what are the benefits of working with Cambridge Pixel?

We've saved a considerable amount of money. We spent a lot of our own money and took on risk to take on the software for the Type 45 Destroyer and the QEC, but the through-life savings to us have been greater.

We have a very close working relationship, it's never felt like an us-and-them contracting arrangement. It's a very constructive relationship.

David, has working with Mission Systems influenced your approach to market?

Our initial customer was North American but for obvious reasons we were keen to see our solutions deployed in the home market. We really wanted to build a relationship with Mission Systems.

We wanted to win business with our products and we had the radar display applications Mission Systems was using specifically in mind. We felt that we had something that was applicable, that would be appreciated and represent signifi-

cant benefits to our customers.

As with all our customers, working with Mission Systems let's us learn. We gain practical experience, understanding the real problems that people are having when they're deploying radar display systems or building network and radar distribution systems. We get a lot of extremely valuable feedback from relationships like this.

You can build a solution that works in the lab but you only really understand the problems when you get to talk with engineers who have to make things work.

THE ABILITY TO SEPARATE THE SOFTWARE FROM THE HARDWARE AND REFRESH THE HARDWARE INDEPENDENTLY IS A MAJOR STEP FORWARD

David Johnson



Above: Mission Systems' Long Range Radar and Sampson Multi-function radar are prominently situated on the Type 45 Destroyers such as HMS Daring, pictured here



Above: Brian Page (left) and David Johnson agree that the relationship between their respective businesses is very constructive