

Jackie Cole (L), Andrew Pauza, and Richard Lione (R) with the Plarion team

Optical media technology is the envy of the world when it comes to certain scientific applications, as the team at Plarion tells Elizabeth Toppin

Optical media technology in a whole new light at Plarion

This is nothing if not an industry of consolidation, as people are always commenting on (and predicting more of), but it sometimes does have the converse effect, with new companies rising up from those that have fallen by the wayside.

One such company is Plarion, which was created by a determined and dedicated core of scientists and engineers from the former Plasmon, once famous for its UDO (Ultra Density Optical) discs. When Plasmon went into administration in 2008, the wheels were set in motion to save the knowledge and experience held by the team, along with some of the clients – and the equipment.

“THE CAPABILITIES WE TAKE FOR GRANTED IN THE OPTICAL MEDIA INDUSTRY ARE THE ENVY OF THE WORLD”

JACKIE COLE

TTP Group together with LingVitae Holding, which was a major Plasmon client, acquired assets and some key technologies related to optical devices and materials from Plasmon, and secured the jobs of 10 former employees on the TTP site.

“There were some financially viable projects at Plasmon and it was a shame to see them slipping away,” explains project manager Dr Richard Lione. “The big issue was that we needed the equipment to continue with projects – spin coaters, a lab, a moulding machine, testers – all of which are expensive, particularly when you have no capital.

“Fortunately, through the enterprise of Robert Longman, who at the time was the technical director

of Plasmon, and is now our managing director, TTP Group and LingVitae Holdings saw the potential and made the required capital investment. The new Plarion team was created and the exciting projects became the focus of a brand new viable business.”

In effect, Plasmon closed its doors at the end of January and the new Plarion team started work in February. There are 10 members of the team (11 including Longman, who is not a full-time member of staff), all based at the company’s facility in Melbourn Science Park on the outskirts of Cambridge.

There was an element of ‘all hands to the pump’ in the new incarnation, as project manager Dr Jackie Cole explains: “We all had to wear different hats, and still do: setting up a business when you’re all physicists and chemists means you have to get involved in marketing and accounts and IT. Plasmon had people to do those specific jobs but we had to learn to do all that ourselves.”

Hence the fact that Cole, Lione and others all have the title of ‘project manager’ – because some roles have to encompass different skill sets.

The company’s name came about for a number of reasons: first, it has some leverage of the name Plasmon. “There were also constraints of being able to get a domain name,” Lione explains. “It did resonate when we came up with it, unforgettable and not industry-specific,” says Lione.

THE MAIN PURPOSE OF THE NEW ENTITY was to set up a team to supply consultancy and product development services based on its experience of optical media manufacturing and test systems. There are also many opportunities to apply the existing skills in optical surfaces, microstructure manufacturing and testing in other industries.

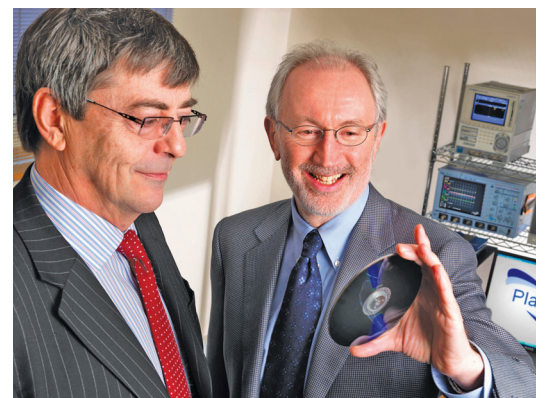
The company has started off exploring all the possibilities in its immediate area, Cole explains. “This is a very good location because there are a lot of technology ventures on the science park. They often have projects that overlap in some ways and potentially have a need

for our equipment. In addition to our existing projects, we are visiting local companies to see if they have a need for the equipment and capabilities we have.”

The company also holds open days to show people just what it can do.

Optical disc technology is at the heart of it all and, despite the knocking the industry has taken in recent years, it can hold its head up high in the scientific community, according to Cole. “The kinds of capabilities we take for granted in the optical media industry are the envy of the world. To be able to do things like nanometre accuracy in injection moulding are regarded as an incredible capability.

“For instance, consider Blu-ray moulding: the BD substrate contains 50 billion pits spread across 17 miles of track. Each pit can be replicated to $\pm 1\text{nm}$ precision with a 6-second cycle. And, once you’ve got your stamper set up, you can do it for a cost of approximately 3 pence. That is very impressive to people outside the industry. We’re used to it but that sort of moulding accuracy over a product run – for that kind of cost – is phenomenal to companies outside the industry.”



Bob Longman (L), CEO of Plarion, and Peter Taylor, CEO of TTP Group and director of Plarion

Plarion is already getting requests from companies to mould different things for a variety of applications. "We can do it," says Lione, "but the real question is how many they want: we have to get a mould made, so if they want a large number then it's worth it. But otherwise it can be too expensive."

However, moulding is by no means the only skill on offer, and there are other ways to keep any number of clients happy. When it comes to the question of a request being too small for moulding, there are alternatives, says Cole.

"What we find more useful for prototyping and short runs is our UV lithography. We've got a system whereby rather than having a thermal polymer we have a UV-curable lacquer. The cost there is just to make a stamper and put an imprint in the lacquer so you can make smaller numbers and it's more cost-effective than injection-moulding. There are a lot of industry applications that can use these techniques for short-run samples or prototyping."

Other technologies include vacuum lamination, and thin and 'thick' (100 micron) film coating, as well as the equipment for measuring thin film properties. "As well as being able to put down a thin film for a client to a specification, we can measure it to make sure it is what we say it is – thickness, refractive properties, etc," says Cole.

The array of equipment at the Plarion site is enviable and includes equipment with names that virtually everyone in this industry knows. A DisCJet from Netstal; a CD-R line from Steag HamaTech, and testing equipment from Dr Schenk, Pulstec and ETA-Optik.

Other systems that are the envy of many clients include a Weiss oven for media life testing. "Not everyone carries out tests for temperature and humidity, but we do both," says Cole. "That is something that we can explore in any industry."

There is also a laminating system from Lintec. "We have been asked if we can laminate different shapes," Cole adds. "These can, for instance, be used for the flexible displays that are being developed, like a laptop screen that can be rolled up and put in your pocket." The company is ideally suited to provide services for that particular sector.

The list of hi-tech systems continues, and the team is understandably proud of what it can offer. "Analytically we have a lot of equipment that many development labs in our area have to hire in," says Lione.

There is also a bespoke lab where a lot of preparatory work can be carried out for biological trials, as well as for anything optical disc related. "We have the ability to do some chemical-reaction work, such as distillation; we can make solutions, pull out solids from solutions to analyse them – we have enough here to

do what we need," says Lione. "Some of the work is light-sensitive so we have a darkroom for that."

However, one of the real pride and joy systems is the Unaxis 9-chamber sprinter coater with a multi-source cathode for sputtering any combination of four materials. "We can coat wafers and all sorts of surfaces and substrates," says Cole. "For instance, we can put down layers of gold, which act as a catalyst on glass slides for bio-medical applications, or make nano-probe written data storage equipment. There are all sorts of new applications for the equipment we have."

"People are tremendously interested in what we've got and the incredible application in other areas. One of the most notable is the bio-project we're working on – it's a sort of a 'lab on a disc' approach that is much faster than methods in that industry."

THE BIO-MEDICAL INDUSTRY is a key area for Plarion, and one in which the optical disc technology can really come into its own. One of its current projects started with LingVitae, now one of Plarion's parent companies. "LingVitae's owner has a series of patents licensing the idea of turning DNA into digitised fragments, effectively splitting it into fragments that can be digitised and read back as 1s and 0s," Lione explains.

"Our part of the project is this 'lab on a disc' idea, to put the fragments onto a disc so that you can read them

"WE ARE EXCITED ABOUT THE CHALLENGES AND OPPORTUNITIES OF USING THAT NANOTECHNOLOGY OF OPTICAL DISC DRIVES TO EXPLOIT NEIGHBOURING FIELDS"

RICHARD LIONE

back. The big advantage of this project, when it comes to fruition, is that it is a lot, lot faster compared with existing technology. By digitising DNA and transferring it to disc, it is possible to decode huge numbers of base pairs on a single 12cm DVD disc at unprecedented speed."

In addition, as project manager Dr Andrew Pauza points out: "Decoding a whole genome used to cost tens of millions, now it's tens of thousands, but this could bring it down to hundreds." In fact, there is a prize



UV lithography – ideal for prototype and short-run moulding projects across various industries

up for grabs: \$10 million for the first private team that can decode 100 human genomes in 10 days.

"This technology should be able to do that if we can do it quickly enough," says Pauza. "At the moment second-generation technology uses fluorescent markers and CCD camera arrays. Imagine the same information on an optical disc, spinning at the speeds achievable even on consumer players, and the information rate is orders of magnitude greater."

Plarion may be a relatively new company but, Cole states firmly, it is a force with which to be reckoned. "We haven't just appeared from nowhere, we have a lot of experience and relationships with big company names. For instance, MKM [Mitsubishi Kagaku Media (Verbatim)] took over as supplier of the UDO media, so the product itself has not died with Plasmon. We are continuing to support them with all the testers and software that was developed at Plasmon. The same people are there who we worked with before."

It doesn't stop there: other major names in collaborative work with the Plarion team in the past include Ciba (now part of BASF), HP, IBM Research, Intel, Philips, Singulus, Vmedia, and US-Encode.

In conclusion, says Lione: "I think it is a very positive message that Plarion has emerged out of the ashes of Plasmon. Even in these difficult economic times, and when the optical media industry is also facing a fairly tough situation, a company has managed to start up with a focus very much on ways of exploiting its deep technical knowledge of the optical disc industry."

"When Plasmon went down it created opportunities for new businesses like us. Perpetual Data was formed from the software department of Plasmon and is located in the Plarion offices."

It was good for clients as well. "If we hadn't been able to form this company all that knowledge would no longer be available – the DNA project, and MKM with their UDO support – they're glad that we're still here. In tough economic times, with people being made redundant, that can be when some of the best ideas come about. It was a good opportunity for us to be around as there are a lot of ideas out there that we can exploit."

"We are excited about the challenges and opportunities of using that nanotechnology and the capability of optical disc drives to exploit neighbouring fields. We aim to grow the business by looking for novel applications that use optical disc fundamentals, both within and outside the optical disc field. For us, fields such as bio-technology hold huge potential."



The 9-chamber sprinter coater; at the heart of the operation

■ www.plarion.com