

# Making light work over a distinguished 40-year history

Newport Corporation was formed in 1969 to provide vibration control solutions for laser-based laboratory applications. In the 40 years since, as technology has advanced, the company has grown and developed significantly and now offers a comprehensive range of products meeting the needs of the optical industry. We spoke to Ron Hartmayer, Director of Marketing, PV Systems about the company and its philosophy.



Ron Hartmayer, Director of Marketing, Photovoltaic Systems, Newport Corporation

**PES:** Can you explain a little about the history of the company and what you offer the photovoltaic industry?

**Ron Hartmayer:** Newport Corporation was founded almost exactly 40 years ago in 1969. Our initial product offering was vibration control solutions for laser-based laboratory applications. Newport Tables have since become the de facto standard in research labs worldwide, with more than 50,000 optical tables installed. Over the decades, Newport has broadened its product portfolio extensively and is now offering a multitude of products related to making, managing and measuring light - from lasers and other light sources, optics and optomechanical components, to optical metrology instrumentation.

About 10 years ago, we began offering integrated solutions to our OEM customers in the semiconductor and life health science markets. These products typically included a light source, optics and opto-mechanical components. In some variants more complex motion systems and measurement instruments are integrated into the assembly.

Our entrance into the PV market followed a similar path. For more than three decades, Newport's Oriol Solar Simulators have been used extensively in the characterisation of PV materials in research labs worldwide. These light sources have also been installed in manufacturing plants for in-line testing and quality control.

Additionally our Spectra-Physics lasers have been used extensively in thin film

PV scribing and for via drilling and edge isolation of crystalline silicon-based solar cells for almost a decade by researchers and system integrators alike.

Starting in 2008, Newport introduced a complete range of turn-key production tools, focusing on thin film PV panel scribing and edge deletion. These tools combine many of Newport's core competencies in lasers, motion, optics and opto-mechanics into a high throughput solution, used in 24/7 production environments.

**PES:** Many would associate Newport solely with laboratory products - how much does the photovoltaic sector contribute to your overall business, and can you see it making up for a larger share in the future?

**RH:** In 2008, Newport had approximately \$33m of bookings for PV-related products, such as lasers, solar simulators, sub-assemblies and production tools. With total revenue of \$445m in 2008, this constitutes about 7% of our total business.

We see the current downturn in the PV market as a temporary pause in the longer term expansion of the industry. It has therefore not altered our strategy for investment in the PV market or our bullish outlook for significant growth in the years ahead. Consequently we are continuing to actively engage with leading PV cell and module manufacturers worldwide, investing heavily in R&D and planning to roll out additional products throughout the remainder of 2009.



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**PES:** Can you outline a few of the benefits of your edge deletion system?

**RH:** Newport's SolaryX Edge laser edge deletion system uses a unique design whereby four independent deletion heads move simultaneously along the four sides of the PV module. Up to four 1064nm, high-power, Q-switched lasers are used for the deletion process, with the collimated laser beams routed into the moving deletion heads. Each deletion head uses a compressed air curtain to drive all the ablated material into a debris evacuation zone, resulting in an efficient and clean process.

The deletion pattern is governed by the linear speed of travel of the deletion heads, by the laser repetition rate and by the rotational speed of the scanner used inside the deletion head.

We are therefore able to optimise the ablation process for a wide variety of coating technologies and geometries, allowing for precise and rapid material removal.

Newport designed this system with the end user in mind, operating the tool in a 24/7 production environment. To that end, our system has an extremely small footprint of only 1.8m x 2.5m, is very easy to set-up and align and has a high uptime and minimal maintenance requirement.

Furthermore, our unique tandem filtration system allows uninterrupted operation of the system, while the debris filters are being changed, maximising the system up-time.

**PES:** Laser scribing is obviously a crucial area of PV manufacturing – are you proud of the achievements your company has made in this arena?

**RH:** Newport Spectra-Physics lasers have been used in laser scribing of thin film PV modules for many years. Our broad portfolio of lasers operating in the UV (355nm), Green (532nm) and IR (1064nm) wavelength ranges provide our customers with the optimal solution for scribing amorphous silicon, cadmium telluride and CIGS coatings. In fact our lasers are used to scribe more than 80% of the thin film panels installed to date and have best in class, beam quality, power output, and reliability in production environments. Our newly-released HIPPO-27, for example, is a high-power, high-repetition rate, Q-switched IR laser, which is used in the P1 scribing of TCO. Its high power output at high-repetition rates and excellent beam quality allow it to scribe multiple lines simultaneously, thereby increasing the throughput of the scribe tool.

We are especially proud of the achievements we have made with our SolaryX family of scribe tools, using our Spectra-Physics lasers, motion platforms, optics and optomechanical components. The product line includes an entry level platform, the SolaryX 420, used in the R&D stage, the SolaryX 1250, used in process development and pilot production, and the flagship SolaryX 1600, used in a fully-automated 24/7 production environment.

Utilising our high-precision air bearing motion platforms and the high-quality, highly-stable HIPPO family of lasers, we can maintain the straightness of scribe lines within +/- 10 um, over a full-size panel length, while moving at two metres/sec. Our P1, P2 and P3 scribe platforms therefore provide best-in-class performance, currently operating with TAKT times below 30 secs in actual production.

**PES:** You have a broad product portfolio that provides solutions across manufacturing and development – which sector (high/low throughput, for example) is showing the greatest signs of growth?

**RH:** We are supplying our SolaryX tools to customers in various stages of the product-development cycle, ranging from early-stage R&D, to process development and pilot production, and all the way to full production. The recent financial crisis has, to some degree, limited the funds available for factory expansions, particularly for small start-up companies, and we have seen the pace of planned capacity expansions slow substantially.

We anticipate these activities will resume in 2010, providing us with the long-term growth vehicle for our SolaryX production tools. In addition we have seen many companies re-emphasise their R&D efforts and focus on improving cell efficiencies and lowering manufacturing costs. This has boosted demand for our process development and metrology tools such as our S420, S1250, Solar Simulators, I-V and QE testers and other measurement products.

**PES:** Would it be correct to say that you place emphasis on configuring your products to meeting your customers' specific needs? Or do you offer 'off the shelf' solutions?

**RH:** In reality, most thin film PV module manufacturers are fairly new companies trying to develop their own unique coating technology so as to differentiate themselves in the market place. Our SolaryX scribe and edge deletion tools provide customers with an off-the-shelf solution in the sense that the platforms have a proven track record for getting the job done, as designed.

Of course, each customer's specific module will require some slight changes to the laser-based process due to variations in coating materials, stack thicknesses and TAKT time requirements.

We accommodate these requirements within the existing platforms by tailoring the laser parameters, such as repetition rate, output power, and motion speed of the scribe or deletion heads. Other modifications typically involve the interface to the factory environment, such as communication with the tools in front or behind our tools, as well as communication with the central factory control and automation platform. All of these can be accommodated with modifications to our existing software platform, rather than starting from scratch.

Ultimately, price and time to market are always of essence, and by using existing base platforms we are able to meet these needs more easily and this usually makes more sense from a financial and schedule standpoint for our customers.

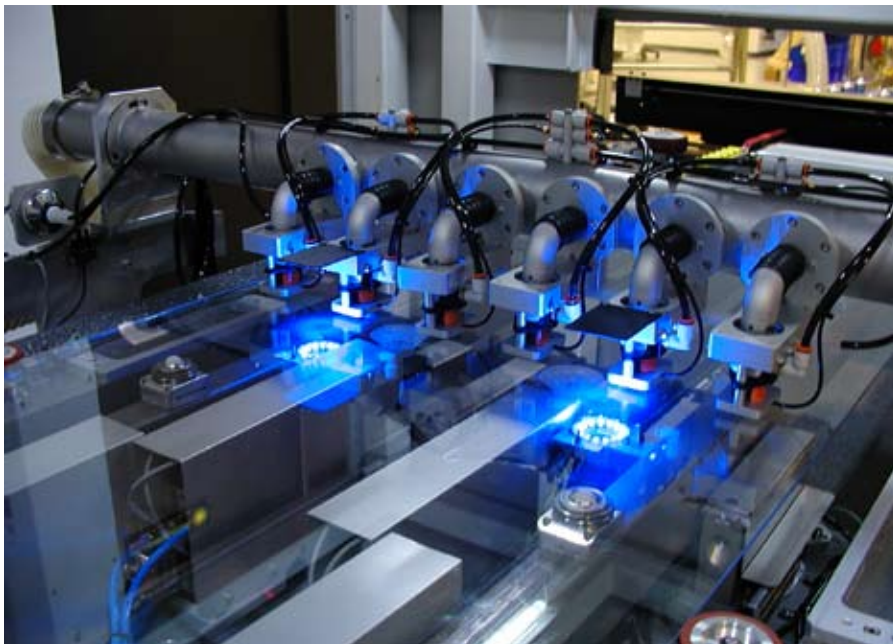
**PES:** How much competition do you face and do you have any strategy in place to hold on to your market position?

**RH:** As in any industry we serve, we face competition. However the PV business is rather immature and does not have large, well-established OEM equipment suppliers at present so most of our competition is from smaller companies and integrators trying to enter this exciting market.

Newport's main advantages are our vertical integration, breadth of relevant technologies and application knowledge, together with our extensive experience making high throughput fully-automated manufacturing systems. Our customers like the fact that we have been supplying many of the components that make up these systems as stand alone products for years and our Integrated Systems Business is very experienced with automation, both on the hardware and software side.

In addition, Newport's worldwide presence, with manufacturing, service and support facilities in North America, Europe and Asia, where most of the PV activities are currently occurring, allows us to engage with customers at their sites during the R&D phase and later on when factories are set up for mass production. Most of our competitors do not benefit from this global infrastructure, which we believe is essential as a long-term supplier to the PV industry.

**PES:** What measures do you take to reduce the impact of



Above: Newport's Solarium 1600P Laser Scribe System (inside view)  
 Below: Newport's Solarium Edge Laser Edge Deletion System



your manufacturing tools on the environment?

RH: Newport is very conscious of the impact its products have on the user and the environment. A case in point is our newly-introduced Solarium thin film laser edge deletion system (LEDS), which is successfully replacing the more traditional sandblasting systems. These systems use very large amounts of sand and are inherently dirtier to use in a clean manufacturing environment.

Furthermore, residual debris particles are ultimately discarded with the sand they are intermixed with.

Our LEDS deploys a dual filtration system, removing 99.8% of all particles passed through it before releasing the air into the factory duct system. This is especially of importance when dealing with toxic materials, such as CdTe, which can be hazardous to system operators and the environment alike.

PES: Europe is obviously a huge market for your business, are you actively pursuing further growth in the region?

RH: Europe has always been a key market for Newport, second in size after North America. We have a large manufacturing operation in Beaune, France and a fairly large presence in Germany, where we have sales, application support and service staff operating out of our Darmstadt location.

With many of the world's leading PV companies based in Germany, we opened a PV application lab in 2008, located in Stahnsdorf in close proximity to the Solar Valley region. Newport also has a system level service organisation in Europe, with several people trained and dedicated to our PV product line. We believe that being close to our European customers, providing both pre and post sales support, will enable us to grow our PV business in Europe in the long term.

PES: We note that you recently opened a laboratory for innovative solutions in the manufacturing of solar cells in Berlin-Stahnsdorf, Germany. Can you tell us a little about your work there?

RH: The application lab in Germany has been equipped with a variety of laser process tools, for both scribing and edge deletion, so as to process actual customer samples. We also have extensive metrology equipment to measure and validate the performance of these tools in order to refine the process used for each customer.

Staying close to our European customer base allows for fast turnaround and also provides easy accessibility to customers who want to take part in our testing of their samples. We strongly believe in building long-term relationships with our customers, and it starts during the early stages in the apps lab.

PES: What single message would you most like to share with our readers?

RH: Newport has been a trusted partner in the laser and optics industry for more than 40 years. We have successfully translated our expertise with lasers, optics and motion into industry leading PV processing tools, while also building lasting relationships with our customer base. Our product introductions into the PV market have helped lower costs and further enable the solar revolution, and we are proud to be part of that transformation. ▲

For more information, visit: [www.newport.com](http://www.newport.com)