



LIA TODAY

THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA
The international society dedicated to fostering lasers, laser applications, and laser safety worldwide.

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Photo courtesy of Laser Safety Industries.

Eyewear for Laser Safety

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Laser Institute of America

Laser Applications and Safety

LIA TODAY

THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA

LIA TODAY is published bimonthly to educate and inform laser professionals in laser safety and new trends related to laser technology. LIA members receive a free subscription to *LIA TODAY* and the *Journal of Laser Applications*[®] in addition to discounts on all LIA products and services.

The editors of *LIA TODAY* welcome input from readers. Please submit news-related releases, articles of general interest and letters to the editor. Mail us at *LIA TODAY*, 13501 Ingenuity Drive, Suite 128, Orlando, FL 32826, fax 407.380.5588, or send material by e-mail to lia@lia.org.

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ABOUT LIA

Laser Institute of America (LIA) is the professional society for laser applications and safety. Our mission is to foster lasers, laser applications and laser safety worldwide.

We believe in the importance of sharing new ideas about lasers. In fact, laser pioneers such as Dr. Arthur Schawlow and Dr. Theodore H. Maiman were among LIA's original founders who set the stage for our enduring mission to promote laser applications and their safe use through education, training and symposia. LIA was formed in 1968 by people who represented the heart of the profession—a group of academic scientists, developers and engineers who were truly passionate about taking an emerging new laser technology and turning it into a viable industry.

Whether you are new to the world of lasers or an experienced laser professional, LIA is for you. We offer a wide array of products, services, education and events to enhance your laser knowledge and expertise. As an individual or corporate member, you will qualify for significant discounts on LIA materials, training courses and the industry's most popular LIA conferences and workshops. We invite you to become part of the LIA experience – cultivating innovation, ingenuity and inspiration.

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CALENDAR OF EVENTS

Laser Safety Officer Training

July 12-14, 2011 | St. Louis, MO
Dec. 6-8, 2011 | Orlando, FL

Laser Safety Officer with Hazard Analysis*

Sept. 12-16, 2011 | Washington, DC
Oct. 24-28, 2011 | Orlando, FL

*Certified Laser Safety Officer exam offered after the course.

Medical Laser Safety Officer Training*

July 23-24, 2011 | Chicago, IL
Sept. 17-18, 2011 | Washington, DC
Nov. 12-13, 2011 | New Orleans, LA

*Certified Medical Laser Safety Officer exam offered after the course.

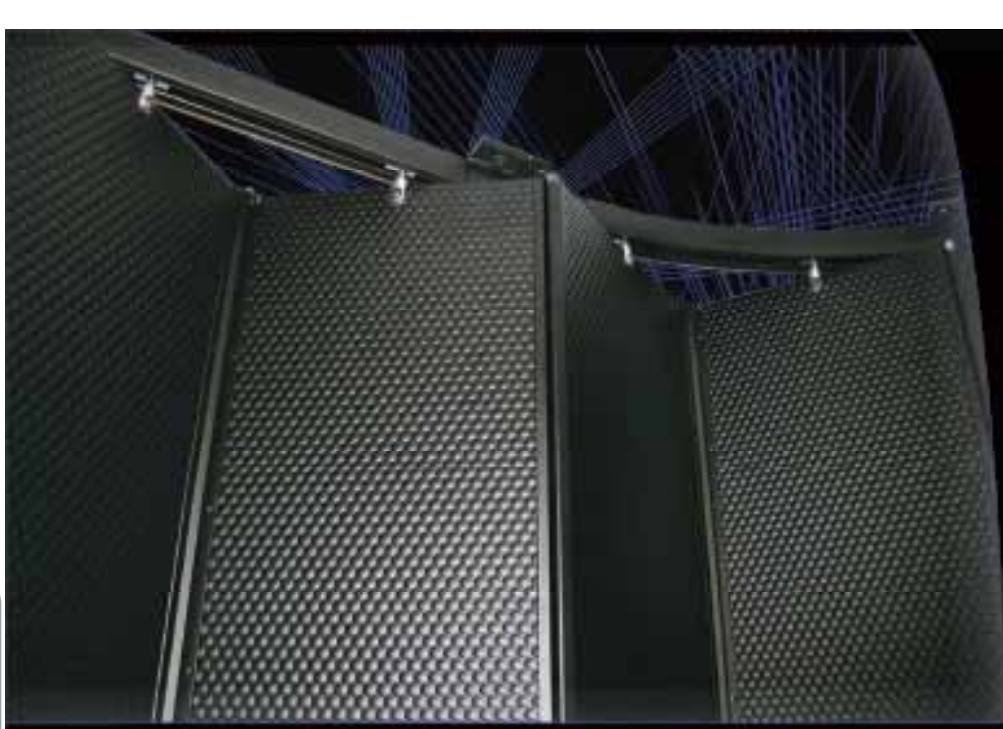
LME 2011

Sept. 27-28, 2011 | Chicago, IL

ICALEO[®] 2011

Oct. 23-27, 2011 | Orlando, FL

Visit www.lia.org for all course and event listings.



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LIA's Industrial Laser Safety Package

Introducing LIA's Industrial Laser Safety Package - the one-stop shop for all of the needed information and references for any laser safety officer working in the industrial field. Included in this package is the **ANSI Z136.1 for Safe Use of Lasers** standard, the parent document and cornerstone of the Z136 series of laser safety standards.

Also included in this package is a copy of LIA's popular *CLSOs' Best Practices in Laser Safety*, as well as our practical quick reference guides, *LIA's Laser Safety Guide* and *LIA's Guide for Selection of Laser Eye Protection* — all essential to ensure your Laser Safety Program is compliant!

Make sure your laser safety library is complete and up-to-date. LIA — educating the world on laser safety.

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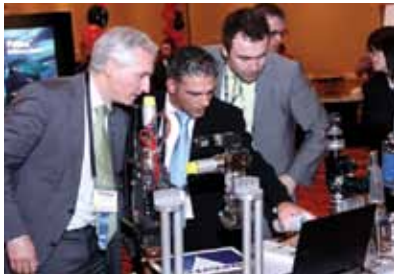
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PRESIDENT'S MESSAGE



Since this issue of *LIA TODAY* is devoted to laser safety, it's a good time to look at the increasing demands on laser job shops and the need for sound practices to avoid injuries. As demand increases for laser applications and custom processing — from powder and wire cladding to metal cutting, welding and drilling — it is imperative to choose the right equipment and eyewear (see article regarding eyewear safety on page 6). That's

where LIA comes in.

Laser safety has been job No. 1 throughout LIA's 43 years. We train laser safety officers in medicine, research, industry and the military and work with the Occupational Safety and Health Administration to foster more healthful workplaces, educating many OSHA inspectors. We offer safety programs ranging from one-day overviews to three-day training courses for safety officers. Our expertise is also available via online courses and multimedia. For maximum convenience, LIA offers The Evaluator, the industry's only web-based laser hazard analysis system. For a low monthly fee, exact calculations for optimum safety conditions are at your fingertips (www.LSEVAL.org).

Even better, job-shop personnel have a rare opportunity to gain in-person expertise at LIA's first-ever Lasers for Manufacturing Event in September (see article on page 8). Industry experts will be demonstrating laser-processed parts and detailing their success stories in an event geared to illustrate one thing — the proper, effective and profitable use of lasers for production needs large and small.

Whether you join us in person, online or through our various publications, LIA looks forward to being your partner in laser safety.



Stephen Capp
President, Laser Institute of America

EXECUTIVE DIRECTOR'S MESSAGE

WHEN NOTHING HAPPENS!

When nothing happens in a laser environment does it mean that nothing was done? Not at all! If there is no loss of sight, no burned skin, no inhalation of noxious fumes and no electric shock, then it means that a lot has been done.

It means that the organization with the laser has taken the responsible approach to using it, has appointed a trained or certified laser safety officer, complied with the guidelines set out in the ANSI Z136 series of standards and provided a safe environment with appropriate training for its people. Our laser safety officers do a great job keeping people safe and ensuring that nothing happens. This is an important and under appreciated factor in the rapidly increasing growth of the laser industry.

In March, laser safety professionals from around the world met in San Jose at our International Laser Safety Conferences (ILSC®). The conference provided a forum for researchers to report on safety factors associated with new lasers, wavelength and pulse widths. There were also Practical Application Seminars (PAS) showing how to put all of the available knowledge to use in a real world setting. New this year was the Medical PAS which was very well received by the attendees and provided a vital forum for medical safety professionals, and is not available anywhere else. We plan to substantially increase the Medical PAS in 2013.

In addition to the technical sessions, there were numerous meetings of committees and subcommittees of both ASC Z136 and IEC TC 76 ensuring that these standards evolve and are revised to meet changing conditions.

We at LIA are very pleased to host ILSC and the standards committees as part of our mission to “foster lasers, laser applications and laser safety worldwide” and look forward to the next ILSC in Orlando in 2013.



Peter Baker, Executive Director
Laser Institute of America
pbaker@lia.org



EYEWEAR FOR LASER SAFETY

By Geoff Giordano

As more manufacturers look to boost efficiency and profitability by employing lasers in their production lines, the importance of educating users on selecting the proper protective eyewear grows increasingly urgent.

The first step, says LIA Education Director Gus Anibarro, is to “select the eye protection that has the appropriate optical density for the wavelength(s) of the laser(s) being used. If you select the wrong eye protection, you have no protection.”

As the go-to source for cutting-edge laser safety training, LIA ensures that its safety information is always up-to-date — particularly in the vital area of eyewear. For example, the *LIA Guide for the Selection of Laser Eye Protection*, updated in 2007, details guidelines from ANSI Z136.1 and all new information regarding available laser safety eyewear and eye-protection products. For those who need quick calculations of eyewear safety parameters, LIA offers the free optical density (OD) calculator on its website (<https://lia.org/evaluator/od.php>). The calculator is a free component of The Evaluator, LIA’s exclusive web-based laser hazard analysis system.

SAFE FOR EYES

When enclosing the laser system isn’t an option, choosing eyewear is of paramount importance.

“I recommend (new laser users) first find out the wavelength of the laser at output power, and for that they select the appropriate eye protection — the right optical density for the wavelength they’re using,” Anibarro says. “Then I recommend they contact a laser eyewear manufacturer; I usually give them three different companies to contact so they can shop around. Eyewear manufacturers can do the calculation for them.”

Of course, LIA’s web tools can also perform those calculations, as well. While the OD calculator is free, The Evaluator offers a full suite of up-to-the-minute hazard calculations for varying monthly fees.

“As soon as there’s any (new standard info) that comes in to us or we discover something we should add to it, it gets updated almost immediately,” Anibarro notes. “That’s the beauty of having a web-based system. Everybody who has a subscription will get that update. It’ll happen quickly. For example, when the revised ANSI Z136.1 standard comes out, we can update the software within a week and all the changes will be made to it. Some changes may take a little bit longer than others, but generally it takes anywhere from within 24 hours to a week.”

While there are no industry-specific eyewear requirements,



Make sure you are educated on the correct protective eyewear for your particular laser situation.
(KXLdarkMW_RGB glasses from Kentek.)

the rapid pace of advances in laser technology certainly affects users’ choices of protection.

DENSITY CHALLENGES

Optical density “is based on the MPE — the maximum permissible exposure limit — as compared to the irradiance on the limiting aperture,” Anibarro notes. So, he says, whether you’re using a CO₂ laser or a neodymium yag laser, for example, optical density is calculated the same way.

However, “laser powers are going way up, particularly in the industrial side,” says Tom MacMullin, president and general manager of Kentek in Pittsfield, NH. “If you look at the optical density requirements for some of those high-powered lasers, we build eyewear that has very high optical density — but we don’t market for that. Anything above OD 7 is a skin hazard, so the industry has a challenge there: Do you want to mark for those high ODs knowing you’re putting aside the issue of skin hazard?” He notes that certain UV wavelengths will cause mutation.

MacMullin, who wrote a detailed primer on choosing the proper laser eyewear in *LIA TODAY*’s July-August 2004 newsletter, also notes that short-pulse lasers — for example, femtosecond lasers — pose a challenge.

“Polycarbonate laser protective eyewear works because the dyes absorb the energy and turn it into heat,” he explains. “The ability to protect you from a laser is dependent on the ability to turn light energy into heat. If the heat is too intense it cannot dissipate fast enough, so the light (laser) can get through. In femtosecond applications, that can happen so fast that when the laser power is turned off you won’t see any damage on the eyewear.” This is called photochemical bleaching, “a temporary phenomenon where the beam opens a window through the dyes, but as soon as the power is removed, the window closes. So even though plastic eyewear with dyes in it will have a very high OD, under femtosecond conditions all bets are off.”

EDUCATE YOURSELF

In addition to OD considerations, users should make sure the eyewear they choose is highly adjustable for individual users and well constructed. For example, there should be no bubbles or pits in the laser filter materials. Dyes and colorants should be evenly dispersed in lenses and frames, with no evidence of photobleaching (loss of color). There should be no scratches or “crazing” — a series of cracks spread out like a spiderweb.

Of course, careful inspection of eyewear over time is key to maintaining users’ protection as the equipment is subjected to use.

“We always discuss inspection of eye protection,” Anibarro says. “Some things to look for are burn-through times. The longer it takes for a beam to burn through the eye protection the better for the user. We discuss all that in our classes.”

Eyewear safety will also be discussed at LIA’s first-ever Lasers for Manufacturing Event in September in Schaumburg, IL. “I’ll be showing pictures of industrial eye protection like the full-face shield,” Anibarro says.

To register for LIA safety courses and workshops, or order publications like the updated *LIA Guide for the Selection of Laser Eye Protection* (\$27, or \$22 for LIA members), visit www.lia.org. ■

Geoff Giordano is a freelance writer.

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LOOKING AT LME

LASER SAFETY COMPLETES LME EDUCATION PROGRAM

By Geoff Giordano

LIA has assembled a stellar roster of speakers and exhibitors for its first Lasers for Manufacturing Event (LME), a unique show that will focus exclusively on laser-based production applications — and their potential for significant return on investment.

Dozens of renowned experts and companies have been lined up for the first-ever LME to be held Sept. 27-28 in Schaumburg, IL. Excitement over the show is building as industry insiders recognize the opportunity to showcase the production efficiencies and profits lasers can bring to operations large and small. System integrators, laser marking, robotics companies — all are finding

LME 2011

LIA'S LASERS FOR MANUFACTURING EVENT

LME is a forum for them to share their wealth of knowledge to push laser manufacturing.

“I see value for the exhibitors as not being the needle in the haystack, as is often the case at the big shows in the U.S., where lasers are a side thought,” said Silke Pftüger, director of marketing and sales for Laserline. “I see value for the visitors in having all aspects of laser technology laid out for them in one place. We will show our latest products, even higher power and brightness fiber-coupled diode lasers.”

Laserline is one of the many cutting-edge exhibitors planning to feature their laser-manufacturing success stories, along with ABB, AppliCote Associates, Coherent, EMAG, Fraunhofer ILT, IPG Photonics, Laserage Technology, Laser Mechanisms, Miyachi Unitek, Preco, SPI Lasers, TRUMPF and more.

“By bringing all of the major laser industry suppliers together and putting them under one roof, LME should attract the highest

concentration of laser-specific attendees of any tradeshow in North America,” said Laser Mechanisms President Mark Taggart. “Laser Mechanisms will present to LME’s targeted audience our broad spectrum of capabilities across multiple markets — many which may not have been realized before.”

THE ALL-ENCOMPASSING LME

LME is designed to give designers and manufacturers everything they need to understand lasers and laser systems — and employ them effectively and profitably — as U.S. manufacturers modernize and upgrade their technology to remain competitive in the global economy.

“The laser industry has grown to be so diverse in vendors, suppliers and processes that it warrants an independent machine-tool and process show,” noted GE Aviation consulting engineer Todd Rockstroh, who will address the impact of lasers in aerospace. “This will give the novice user the ability to not only seek competitive opinions on laser technologies, but gain less-biased opinions from fellow industrial users. Experienced users can evaluate competing technologies from suppliers who aren’t currently in a given company’s inventory in a compact setting.”

One of the main highlights of LME is the laser technology showcase. The show floor will be equipped with two theater areas where more than 20 exhibitors will present slides and videos of their equipment and examples of parts manufacturing their equipment. Exhibitors will discuss the advantages of their approaches. Examples of laser-manufactured parts will also be on display at their booths.

The educational program will feature four free 30-minute presentations on the impact of laser technology in laser-additive manufacturing and the aerospace, automotive and medical-device industries. Meanwhile, free one-hour refresher courses will keep attendees up-to-date on the main laser types used for manufacturing, laser systems, the advantages of laser-based vs. conventional approaches and basic laser safety.

BUILDING LME

“Building up LME in less than a year since it was first proposed took intensive effort,” says LIA Executive Director Peter Baker. “The charter exhibitor group were instrumental in reaching out to people we didn’t have personal contact with,” he noted. “For instance, Bill Shiner (vice president of industrial markets for IPG Photonics) — who is the prime mover behind this — was able to reach out to system integrators he uses and some of the robotics experts he knows.”

Despite years of experience creating intensive workshops and its annual ICALEO® conference, LIA has had to take a different direction with this unique event.

“(LME) is a horse of a different color because we’re dealing with end-users — the people who want to take this stuff and make things,” Baker said. “With ICALEO we’re dealing with the



A highlight of LME will be the laser technology showcase, where exhibitors will present their latest technology and give demonstrations and examples.

guys who understand the science of it. The one-hour tutorials are aimed to be much more fundamental. Some of the people we want to come to the exhibit perhaps have not used a laser and aren't familiar with the terminology. We think it's a good mix; we think someone can come in knowing nothing, get an overview and then see parts just like the ones they're working on made effectively with the laser."

In his presentation "Choosing the Low Cost Method for Manufacturing," Dr. Robert Mueller said he will look at "several laser manufacturing methods — remote laser welding, laser cutting, hybrid laser welding — and compare their cost structure and productivity to traditional processing methods, (namely) resistance spot welding, press-blanking and MIG welding. I will show that the low-cost manufacturing method depends on the production volume, and that there is a range where the traditional method is most cost-effective and a range where the laser method is the low-cost solution."

Detailed analysis of a firm's needs is critical, said Mueller, who is senior laser solutions engineer for NuTech Engineering in Milton, Ontario, Canada: "Unless one does this kind of analysis, the break-point between traditional and laser processes is not clear, and one could easily choose the high-cost process, and then be stuck with it for the life of the product. The recent advances in laser technology, efficiency and cost have also moved these breakpoints significantly, and laser processes that were

technologically sound but not cost-effective have become cost-effective for many applications."

Mueller expects LME will attract "people from outside the established laser-user community: engineers coming to see what lasers can do, what a system costs, how big these systems are and what it takes to run one." ■

Geoff Giordano is a freelance writer.

EVENT DATES

September 27-28, 2011

Tuesday, 9am-6pm

Wednesday, 9am-5pm

EVENT LOCATION

Renaissance Schaumburg Convention Center Hotel

1551 N. Thoreau Drive

Schaumburg, IL 60173 USA

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ILSC 2011 – A CLOSER LOOK AT LASER SAFETY

THE WORLD'S LEADING CONFERENCE ON LASER SAFETY WAS HELD IN MARCH

Presented by LIA, the International Laser Safety Conference (ILSC®) is a comprehensive four-day conference covering all aspects of laser safety practice and hazard control. Laser safety experts from around the world descended on San Jose, CA to discuss and define the latest changes to regulations and common practices in the field. Held March 14-17, 2011, scientific sessions addressed developments in regulatory, mandatory and voluntary safety standards for laser products and for laser use.

ILSC is the pinnacle of laser safety meetings. The conference has evolved to have two tracks with a significant benefit to the laser safety community. The first track is the Technical Sessions with presentations by recognized worldwide experts in a variety of fields relevant to the cutting-edge in laser safety, called the Laser Safety Scientific Sessions, which was chaired this year by John O'Hagan from the Health Protection Agency in Great Britain. The second track is the Practical Applications Sessions (PAS), now with both technical laser safety and medical laser safety components. These PAS sessions have grown into a favorite of the working laser safety officer, with many talks about the day-to-day challenges facing them. As new and novel laser applications push the envelope of modern technology, protection of personnel from the complex laser hazards is paramount to assuring success. Sheldon Zimmerman from the Naval Surface Warfare Center chaired the technical PAS and Vangie Dennis from the Gwinnett Medical Center chaired the medical PAS sessions.

ILSC PLENARY SESSIONS

The 2011 ILSC provided attendees with significant opportunities to hear from the top experts in the field of laser safety through the opening plenary and closing plenary sessions, explained Conference General Chair Ben Rockwell, Ph.D., Air Force Research Laboratory, Brooks City-base, TX.

ILSC featured two renowned speakers for its opening plenary session entitled "Lasers and You." This session started with Dr. Leon McLin from the Air Force Research Laboratory who spoke on "Dazzling with High-Powered Laser Pointers." This was an exciting discussion of the proliferation of low-cost, high-power laser pointers and their impact on accident reports and incidents

involving commercial aircraft. Dr. Kay Ball, associate professor at Otterbein University presented, "Lasers in Health Care Today." This talk highlighted the latest in laser use in the medical field with applications in fields as broad as dermatology and ophthalmology. Both speakers addressed today's hot topics for all ILSC attendees.

"ILSC featured five of the most-requested topics for the closing plenary session. The topics included laser accident reports, changes of safety limits in the thermal regime, laser applications for digital display cinema, building a laser safety culture and safety of lamps and broadband light sources," said Rockwell.

Bill Ertle, president of Rockwell Laser Industries in Cincinnati, OH, presented the briefing on laser accident reports. Karl Schulmeister from Seibersdorf Laboratories in Austria presented a comprehensive discussion of the changes to the exposure levels for pulses in the microsecond to several seconds exposure regime. Casey Stack from Laser Compliance in Centerville, Utah presented an illuminating review of proposed uses of lasers in movie cinemas for high brightness sources (see complete article on page 18). Ken Barat from Lawrence Berkeley National Laboratory presented a comprehensive discussion of building a laser safety culture. Finally, Dr. David Sliney, a recognized leader in the field, presented the latest in lamp safety standards and their implications to the laser safety professional. These topics were presented by recognized experts in the field who provided the status of each topic with clear-cut precision, allowing all attendees to know the latest in each provocative topic.

LASER SAFETY SCIENTIFIC SESSIONS

Thirteen individual sessions made up the Laser Safety Scientific Sessions of ILSC 2011. These ranged from presentations on the basic biological effects of laser radiation through standards to practical laser safety issues.

"We were pleased to have enough proffered papers by the submission deadline, which made the scheduling straightforward. However, due to budget constraints, a number of presentations were withdrawn. This did not mean empty slots. Perhaps driven by



Keynote speakers Kay Ball, left, and Leon McLin during opening Plenary Session.



John O'Hagan, right, receiving his 2011 Laser Safety Scientific Sessions Chair plaque from Benjamin Rockwell.

the threat of having to tell jokes or sing for 20 minutes, the session chairs did an excellent job by either filling the empty slots with presentations themselves, or by taking advantage of papers received after the submission deadline,” explained Laser Safety Scientific Sessions Chair John O’Hagan, Ph.D, Health Protection Agency, Didcot, U.K.

There were a total of 52 papers presented, of which a sampling of the topics covered is given here.

“There is no doubt that the two bioeffects sessions justify attendance at ILSC for many participants, particularly those traveling from outside the U.S. This also provided the opportunity to hear about the rationale for the recently-published revised draft guidelines for exposure limits (MPEs) from the International Commission on Non-Ionizing Radiation Protection,” said O’Hagan.

Laser accidents continue to happen and Michael Woods from SLAC National Accelerator Laboratory described the lessons learned from an injury to a graduate student while adjusting a polarizing beam splitter. Ian Gillett of Imperial College, London, described how he was implementing a competency scheme for different levels of laser safety management. He outlined an incident where a researcher had a near miss, but was carrying work at a level that he had not demonstrated competence.

“Laser eyewear standards use different approaches in the U.S. and Europe and it was interesting to hear of proposals to produce an ISO standard from the leader of the project group, Roy Henderson; Sharli Frederikson of the Mayo Clinic covered laser dyes and solvents; Mike Woods x-rays and Ben Edwards of Duke University electricity to remind delegates of the risks from non-beam hazards.

“Whilst we tend to worry about eye injuries from exposure to laser beams, Peter Smith of TASC reminded us of the transient visual effects in people exposed below damage thresholds and how these influence non-therapeutic research,” O’Hagan said.

New for ILSC 2011 was a session on Risks from Non-Laser Optical Sources. Many laser safety officers and others are finding that their remit is extending beyond dealing with traditional laser safety issues. The degree of interest was such that a number of non-laser papers were slotted into other sessions.

“Another first for ILSC 2011 was a poster display. Although this was a small beginning, it is possibly something that will grow in the future to allow even more people to present their work,” said O’Hagan.

TECHNICAL PRACTICAL APPLICATIONS SEMINAR

Attendees of the 2011 ILSC Technical Practical Applications Seminar (Technical PAS) sessions saw a wide variety of subjects in the laser safety field.

“Topic chairpersons all have great experience and knowledge in laser safety and were very interesting presenters,” said PAS Chair Sheldon Zimmerman, CLSO, Naval Surface Warfare Center, Dahlgren, VA.

The first Technical PAS session presented by Greg Makhov and Patrick Murphy on audience scanning at laser light shows provided some of the difficulties encountered in getting approvals

and safely setting up such performances. The session culminated in a set of beautiful laser light shows in which volunteers were scanned with laser beams. Tom Lieb’s session entitled “Laser Safety in the Workplace” gave a well-informed view of obstacles and considerations often encountered in industry. The third session about regulations was made extra informative and interesting with Casey Stack’s presentation style and rewards for participation. David Sliney’s presentation on control measures provided extra insight into practical considerations for control measures, particularly regarding what control measures are reasonable in certain situations.

“The session on measurements and nominal hazard zone determination, presented by Bob Thomas, gave an overview of measurements, calculations and error assessment with a very practical flavor, in spite of the somewhat advanced subject matter. Dr. Thomas was able to provide a lot of good information at an appropriate level for the attendees that were anticipated at his session,” said Zimmerman. “In the last Technical PAS session, Leon McLin talked about laser pointers and dazzling laser systems and some of the practical implications of their use. Overall, the Technical PAS sessions were both entertaining and informative.”

MEDICAL PRACTICAL APPLICATIONS SEMINAR

The Medical Practical Applications Seminar (Medical PAS) was a two-day seminar for medical laser safety officers (MLSOs). This seminar was particularly useful for MLSOs who work in operating rooms, surgical centers, aesthetic clinics and medical spas. Topics included plume hazards, hazards of airway passage, accidents in the operating room, regulations/litigation, setting up a safety program for the O.R. and safety recommendations and regulations.

This year’s Medical PAS was a first-time addition to ILSC. “This was the first medical conference I can remember in a long time specifically for this market, and I was shocked and pleased to see the dynamic group of laser professionals that volunteered to teach. There currently is no other forum for advanced medical laser usage, so this is an event we’d like to repeat every two



Benjamin Rockwell presenting the Technical Practical Applications Chair plaque to Sheldon Zimmerman.

years,” explained Medical PAS Chair Vangie Dennis, RN, BSN, CNOR, CMLSO, Gwinnett Medical Center, Duluth, GA.

“Medical PAS was a great event for the advancement of advanced laser practices in medical usage; we may invite a representative from OSHA next time as we had its research arm



LIA President Stephen Capp, Conference General Chair Benjamin Rockwell and LIA Executive Director Peter Baker.

NIOSH (National Institute for Occupational Safety and Health) there this year. We also had leading experts speaking on topics that covered all facets of the industry, for example, Leslie Pollard of Southwest Innovative Solutions provided an interesting mixture of nursing and engineering while Patti Owens of Olympic Dermatology and Laser Clinic covered the aesthetic side,” said Dennis. “Such a diverse and dynamic group helped highlight all the different components that make up our industry.”

One of the Medical PAS sessions was titled “Myth Busters” where the speakers helped the MLSOs understand why certain standards of practice are followed yet how to analyze and understand the basis of these practices such that appropriate hazard analysis responsibilities and appropriate responses can become part of the role and responsibility of the MLSO when the unexpected occurs.

“Dr. Kay Ball and I do this lecture quite a bit, it addresses dilemmas and how to go about solving issues that arise in a medical setting that involves other aspects of patient safety. This assists the audience in that there is more than one way to resolve a situation or conflict when a patient and physician is involved” Dennis said. “Our

WILKENING AWARD TO ROCKWELL, ROCKWELL AWARD TO DENNIS

Laser Institute of America was pleased to present its prestigious 2011 George M. Wilkening Award to Benjamin Rockwell, Ph.D. for his exceptional contributions to laser bioeffects research at the 2011 ILSC. Rockwell is a principal research physicist in the Air Force Research Laboratory at Brooks City-Base in San Antonio, TX. Established in 1997, the award is named after the first ANSI Z136 Standards Committee Chairman George Wilkening. The award recognizes individuals who have made extensive contributions to laser safety in science, medicine, industry or education.

“The research done by Dr. Rockwell and his team on retinal damage for pulses shorter than one nanosecond has allowed, for the first time, the development of standards covering this regime,” said LIA Executive Director Peter Baker. “We were proud to present him with this well deserved award.”

Rockwell has performed significant service to the national laser safety (ASC Z136) committee and currently chairs the subcommittee responsible for developing the ANSI Z136.1 Standard for *Safe Use of Lasers*. He is also a major contributor to the U.S. delegation to international laser safety committee (IEC/TC 76) thereby contributing

to global as well as national laser safety. He has served as the general chair of ILSC in 2007, 2009 and 2011. He has served on the LIA Board of Directors and is a fellow of LIA.

Also at ILSC, Vangie Dennis, RN, BSN, CNOR, CMLSO at Gwinnett Hospital, Duluth, GA, was awarded the 2011 R. James Rockwell, Jr. Educational Achievement Award for exceptional accomplishments in laser safety education. Dennis has over three decades of nursing experience and has been instrumental in the development and teaching of many well-recognized laser safety programs for professional societies including AORN, ASLMS and LIA.

“With laser safety education as a key component of LIA’s mission, we are especially proud to present this award to outstanding leaders and educators in the field,” said Baker. “As a CMLSO, instructor, author, presenter and trainer, Ms. Dennis has made significant and valuable contributions to laser safety education.”

Dennis has served as a highly rated instructor for LIA’s Medical Laser Safety Officer course, developed and taught LIA’s Advanced Laser Safety Officer and on-line Laser Safety Officer courses. She is the associate editor for the *Journal for Clinical Laser Medicine and Surgery*, served on the editorial advisory board for *OR nurses 2011* and is widely published and referenced in medical literature. She has presented and lectured nationally and internationally and served as chair of the Practical Applications Seminar at ILSC 2011.



LIA’s Peter Baker presenting Benjamin Rockwell with the 2011 George M. Wilkening Award, and Joseph Zulich (2009 award winner), right.



Peter Baker presenting Vangie Dennis with the 2011 R. James Rockwell Jr. Education Achievement Award.

industry is not about equipment and personnel safety and much of our practice involves patients, so it's important to understand the practices and how you make decisions based on that."

The "Experts on the Standards" session provided attendees with information from an international standpoint, from the national AORN standards viewpoint, from aesthetics and lastly research where the presenters talked about what's happening in these segments across the country.

Dennis said that most of the comments heard were about how useful and informative it was to blend the practices of the medical side with the industrial side as all ILSC attendees could come to these sessions.

"We need to reach out to those individuals – LSOs and laser specialists – that this is a forum for them just as much as MLSOs, but overall everyone was very happy with the results of the education delivered given that this was our first year at ILSC," she said.

NETWORKING TOO

In addition to the exciting educational opportunities, ILSC also provided plenty of chances for attendees to network with their peers – from the Welcome Reception and the Sponsor Reception to the "Hot Topic" Luncheon and Awards Luncheon featuring the George M. Wilkening Award Presentation and the R. James Rockwell Educational Achievement Award.

"At ILSC 2011, the technologist and safety professional was able to acquire new skills and sharpen current processes to ensure their organization is up-to-date on laser safety," said Rockwell.

ILSC is the premier gathering of laser safety professionals – there is nothing else like it. It will be held again in 2013. In the meantime, be sure and get the conference proceedings (\$99) at www.lia.org/store/ILSC. ■



The ILSC receptions are great for catching up with old friends and making new ones.



Fellow attendees enjoying cocktails during the Sunday evening Welcome Reception.



The Sponsor Reception offered plenty of new and emerging technologies for attendees to investigate.



Jay Parkinson, moderator for the Hot Topic Luncheon, delighted the audience with his entertaining style.

LASER WORLD OF PHOTONICS CHINA 2011 MAKES A BIG STEP FORWARD

LASER World of PHOTONICS CHINA 2011 was held in Shanghai in March and successfully finished with historical figures that again confirm its leading position in the Asian laser and photonics market. A total of 361 exhibitors from 18 countries and regions attended the tradeshow, a 31 percent increase compared to last year. The exhibition space also expanded to 17,250 square meters, growing by 50 percent. Altogether, the show attracted 28,845 visitors, an increase of 14 percent. Also presenting at the trade fair were country pavilions from Japan, France and Germany.

Guenter Weinmann, general manager of Laser Technology at TRUMPF, was extremely pleased with the number and quality of the visitors. "We were very happy to see customers from different application areas like mobile phones, micro-machine and automotive fields coming to our booth."

COMPLETING THE CHAIN

All leading companies presented their latest solutions and cutting-edge products in clear-cut show segments at LASER World of PHOTONICS CHINA 2011. The positive feedback from exhibitors confirmed that the tradeshow made a big step forward to complete the value chain of laser and photonics technology. For the first time, the machine vision sector was presented at the exhibition with 33 exhibitors. In the field of systems and system components for laser production engineering, new industry key players like Salvagnini, Panasonic, Stäubli, Reis Robotics, Siasun and SteelTailor showcased their products.

LASER World of PHOTONICS CHINA 2011 focused on innovations and applications of laser technology. Demonstration and issuing of new products and technologies were highlighted. Apart from the laser industry, the tradeshow has attracted a large

number of users from application sectors, covering electronics, metal, automobile, science and education, photovoltaic, material processing, aerospace, national defense, optics, semiconductor, industrial application, telecommunications, test and measurement and optical displays.

Gwen Briens, director of Motion Business U.S. and Asia of Spectra-Physics, said LASER World of PHOTONICS CHINA is a very important tradeshow for them in the Asian market, "We are meeting all the customers we touch, especially the research customers. Because of collocation with Semicon and CPCA, there are also a variety of customers from defense, semiconductor, manufacture and photovoltaic areas."

ACCOMPANYING CONFERENCE

Along with the tradeshow, three conferences were held featuring 111 interesting speeches targeted at laser processing, optics, lasers and optronics, precision processing and machine vision. A total of 1,283 people attended the conferences.

At the 6th International Conference on Laser Processes and Components (LPC 2011), supported by LIA, LIA Member and Past President Prof. Andreas Ostendorf from Ruhr-University, Bochum, Prof. Youliang Wang from Chinese Optical Society-Laser Processing Committee (COS-LPC) and Prof. Dr. Minlin Zhong from Tsinghua University shared with visitors their latest findings.

Ostendorf was very satisfied with the high quality of the conference. "This is the first time we had a three-day conference, last year we only had two days. We got more contributions from industry parts as well as academia so it's a nice mixture between academia and industry, which makes it so attractive for industry participants as well as university partners."

At Optics Frontier – The 6th Laser Technology Forum and Outstanding Achievements Release Conference of Chinese Optics 2011, the latest developments and challenges in laser technology were demonstrated to a host of professional audiences. Senior experts from leading laser companies presented their cutting-edge products.

With the theme of "The Application Machine Vision Technology in Industrial Inspection," the Machine Vision Pavilion and the Technology & Application Conference discussed the applications of machine vision technology. Speeches from well-known experts were well applauded.

LASER World of PHOTONICS CHINA 2012 will be held at Shanghai New International Expo Centre March 20-22. For more information, visit www.world-of-photonics.net. ■



LASER World of PHOTONICS CHINA expanded significantly from last year's tradeshow.

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LIA'S LASER SAFETY TRAINING

Lasers and laser-based equipment are constantly evolving as new techniques and uses are developed. The only means to keeping pace with these advances is to educate those using these tools with training, whether through initial or refresher coursework and seminars. Training is an integral tool for the safe use of lasers and laser equipment used in manufacturing, medicine and research today.

The LIA is committed to keeping the workplace safe from hazards associated with lasers. Therefore, LIA offers a complete line of laser safety training courses for personnel in research, industrial and medical laser facilities. All of LIA's courses are based on the ANSI Z136 series of laser safety standards.

ONSITE TRAINING

Although LIA offers several different courses in a variety of locations, there are many instances where attendance is inconvenient due to scheduling or travel constraints. To address these concerns, LIA has developed the ability to bring laser safety training to the workplace with onsite and online options.

Some of the customized in-house training and auditing opportunities available include: Industrial Laser Safety, Laser Safety Officer, Laser Safety in the Lab, Medical Hands-on Skills Validation, Medical Laser Safety Officer and Medical Laser Safety Awareness.

REGIONAL CLASSROOM COURSES

LIA also offers several classroom-based courses – the Industrial Laser Safety Officer, Medical Laser Safety Officer, Laser Safety Officer and Laser Safety with Hazard Analysis. Visit www.lia.org/education/calendar for dates and locations of courses.

100% ONLINE, 100% CONVENIENT

With LIA's online laser safety courses, you have the opportunity to gain more knowledge in less time. Our online laser safety training courses are the most comprehensive and convenient, enabling you to access coursework when and where it's convenient for you. Additionally, the online courses are budget-friendly because they eliminate travel expenses. Following is an overview of our online courses to help you choose the correct one for you.

• NEW! CO₂ MEDICAL LASER SAFETY ONLINE

Developed specifically for nurses in the operating room, surgical scrub technicians and circulating nurses, the CO₂ Medical Laser Safety Course will provide the foundation needed to practice optimal laser safety when working specifically with CO₂ lasers. While the course is ideal for medical staff without any prior laser safety training, it provides a comprehensive overview for more advanced medical laser safety officers as well.

• INDUSTRIAL LASER SAFETY TRAINING ONLINE

If you are working with or around lasers in an industrial setting, there is a unique set of safety concerns to address whether

you are a small shop with one laser, or a large manufacturer with several laser processing systems. From automobile, aircraft and boat manufacturers, to welding shops, this highly focused course provides a comprehensive overview of laser safety as it relates specifically to industrial laser applications.

• LASER SAFETY IN EDUCATIONAL INSTITUTIONS COURSE ONLINE

This course will discuss the basics of lasers, bio-physics, laser safety standards, control measures, accident scenarios and sample lab settings that are used in educational institutions. If you are a student, professor, safety officer, science department chair or high school teacher, this is a great format to get up to speed with the most current laser safety issues.

• LASER SAFETY OFFICER TRAINING COURSE ONLINE

LIA's most popular training program for the laser safety officer (LSO) is now offered over the Internet in a convenient, easy-to-use online course format. As an LSO, you have one of the most important responsibilities in your organization – to uphold the highest standard of laser safety and the enforcement of safety policies in order to protect your team.

The LIA Laser Safety Officer course is packed with useful information you can apply immediately. With a focus on safety program development and administration, it covers lasers and optics, bioeffects, beam and non-beam hazards, control measures and training requirements. Through a non-mathematical approach, the course is designed to teach the administrative duties of the LSO described in the *ANSI Z136.1 Safe Use of Lasers* standard. In addition, the course meets all LSO training requirements outlined by ANSI, OSHA and ACGIH. LIA's Laser Safety Officer online training course is designed for all levels of experience and involvement including industrial, military, educational or research applications of lasers. It is tailored to fit the needs of safety professionals, engineers, laser operators, technicians and other professionals assigned the duties of LSO who are not required to perform hazard analysis calculations.

• LASER SAFETY TRAINING FOR PHYSICIANS ONLINE

As a physician, you have a special set of concerns regarding laser safety at your medical facility, especially in your surgical environment. At LIA, we have assessed these topics and designed an online course focusing on laser safety specifically for physicians.

• MEDICAL LASER SAFETY OFFICER TRAINING COURSE ONLINE

At LIA, we know safety is a top priority in your operating room and medical facility, and we understand the pressure to keep everything running smoothly. That's why we have designed our

Medical Laser Safety Officer (MLSO) online course to meet the special needs of RNs, OR supervisors, training coordinators and other medical professionals who have been appointed the critical responsibility of LSO.

For information on in-house audits, contact LIA's Education Director Gus Anibarro at 407-380-1553 or gus@lia.org.

THE EVALUATOR

As a complement to all our online courses, LIA, in 2010, introduced The Evaluator, the industry's first web-based laser safety hazard analysis system that utilizes an innovative delivery system to provide a new and improved user experience for laser safety officers of all skill levels. Our exclusive web-based Laser Safety Hazard Analysis System is designed to provide enhanced accessibility, easier navigation and more accurate results.

This innovative system provides a reliable way to easily double-check laser safety calculations. It is based on the *ANSI Z136.1 American National Standard for Safe Use of Lasers* and will perform repeated calculations of maximum permissible exposure (MPE), optical density (OD), nominal ocular hazard distance (NOHD), nominal hazard zone (NHZ) and laser hazard classification.

Benefits of the easy-to-navigate Evaluator include being able to change laser settings by easily switching between CW, single pulse or repetitively pulsed lasers as well as adjusting the beam

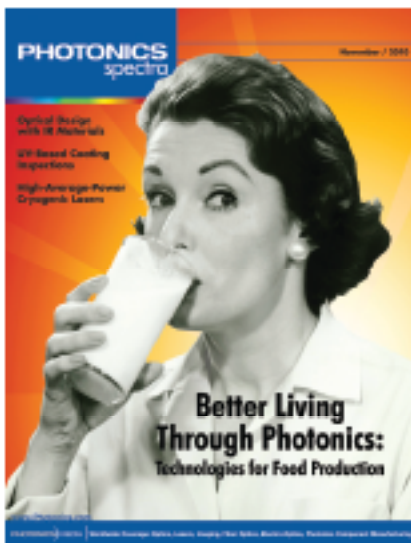
profile, the ability to save reports (advanced/intermediate only), view graphs and make suggestions for new features. You can also experiment with various laser, eyewear or barrier combinations with enhanced interactive graphic displays.

One of the big advantages of The Evaluator is that you can choose the subscription level that fits your specific needs — advanced, intermediate or basic. Why pay more for features you may not need? This budget-friendly option is perfect for organizations that may only need the basic or intermediate calculation features. Plus, you can easily upgrade or downgrade to any subscription level at any time. For more information, e-mail lia@lia.org or visit www.LSEVAL.org.

Now, your laser safety training is just a click away — in a 100% online format! Visit www.lia.org/education/calendar for a listing of all of LIA's courses. ■

LIA'S FREE ONLINE OD CALCULATOR

LIA has added a convenient online tool to its website that will calculate what optical density (OD) is recommended for use with a laser system of a given power. This OD calculator provides a reliable way to easily double-check laser safety calculations. Check it out at www.lia.org/evaluator/od.php.



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COMING SOON TO A THEATER NEAR YOU: LASERS!

By Casey Stack

Although lasers have been used for traditional “light show” entertainment for more than four decades, since shortly after their invention, solid-state laser technology has now advanced to where lasers will soon be illuminating movie screens at your local multiplex. Currently, the entire movie industry is transitioning from “rolling film stock” movie projectors to high-resolution digital projection systems that will ultimately receive movies distributed via the Internet. The elimination of film, which has been used for nearly 100 years, is estimated to save movie studios hundreds of millions of dollars annually.

CONVERSIONS COMING

A significant portion of movie theaters have already converted to digital projection. However, even these ultra hi-tech projectors still utilize high-pressure Xenon short-arc lamps as their light source. This is the same light source used by film projectors for the last 50 years. Xenon arc lamps leave much to be desired as an illumination source. Film makers demand exact color reproduction and uniform image intensities. These illumination parameters, as well as others, undergo continuous degradation as the Xenon arc lamp ages with use. This is such a serious issue that projector lamps must be replaced in as little as 500 hours at costs that can approach \$1,000 a lamp.

Lasers are now being recruited into the task of illuminating movie screens. These include red and blue diode lasers, green diode-pumped solid-state (DPSS) lasers, OPOs (optical parametric oscillators) and VCSEL (vertical cavity surface emitting lasers). The three primaries of red, green and blue can be mixed to generate all other perceived

colors. Using lasers as sources of illumination have several dramatic benefits. The first is maintenance cost and labor savings. Current testing indicates that laser illuminated projectors (LIPs) will likely operate well in excess of 25,000 hours without a “lamp change.” This can translate into maintenance savings of hundreds of thousands of dollars over the life of a projector.

Colors get a great boost with lasers too. Not only do the laser light sources allow perfect color and brightness reproduction from the studio to the cinema every time, but the highly saturated color and wide spaced wavelengths will also allow for future movies to display more colors than ever before. This added color “gamut” will be utilized not only for wonderful special effects, but making more believable life-like imagery as well.

Lasers are also much greener than arc lamps, consuming less power and generating less heat as a more efficient light source. They also eliminate the heavy metal disposal issues associated with many mercury filled arc lamps.

ADDRESSING SAFETY

These and other benefits have already cemented the laser’s position as the most desirable light source for most future projection systems of any size. But what about laser safety? Most people are surprised to learn that these cinema LIPs are generally about as safe as an existing Xenon arc lamp-powered cinema projector. We generally speak of laser light as having three properties that make it uniquely “laser light.” These are: 1) coherence, 2) monochromaticity and 3) very high radiance (brightness per angle). Although all of these are indeed unique parameters of laser light, only one of these contributes significantly to laser light’s potential hazard. This parameter is “radiance.”

The ocular safety of the LIP is about the same as that of the conventional arc lamp movie projector because their radiance values are similar. This is achieved because most of the LIPs being planned today incorporate an “extended source.” This means they do not generate an image by scanning a laser dot or line in a raster fashion, they project the entire image simultaneously with the use of a two-dimensional micro display of LCOS (liquid crystal on silicon), or a DLP micro-mirror MEMs device, such as those used in desktop data projectors.

By spreading this light out into a wide simultaneous 2-D projection, the source laser’s radiance, and therefore its potential for ocular hazard, is reduced by orders of magnitude.

In fact, it can be shown that by the time the light leaves the projector, it doesn’t even technically qualify as laser light. Anyone who has used a laser pointer is aware of the magic shimmer, or speckle, that can be seen where the dot strikes the wall. Speckle is caused by the laser beam’s coherence, and is objectionable to most movie viewers. Therefore, the coherence property of the laser light is removed inside the projector. And, since the radiance has also been dramatically reduced, the projector’s emissions are missing two of



Kodak prototype laser illuminated digital cinema projector. Courtesy of Kodak, Inc.

the three parameters that technically make it laser light.

LIPA FORMED

Unfortunately, today the international laser standards still legally consider these projector emissions “laser light,” and trigger over-regulation, where no typical laser hazard exists. To assist with the smooth commercialization of this new technology, and the prompt revamp of outdated and inappropriate safety regulations, a new trade association has been formed: LIPA (Laser Illuminated Projection Association, www.lipa.org) through the cooperation of movie studios including Disney, projector manufacturers such as Sony and Imax and laser manufactures like Laser Light Engines, as well as others.

Until very recently, the manufacture and use of these projectors were highly regulated in the U.S., and treated as though they were lasers for traditional rock-and-roll concerts that have potential ocular hazard levels a thousand times greater. These federal laser requirements that are appropriate for rock-and-roll lasers are inappropriate and severely market-limiting when applied to LIP Cinemas. However, industry cooperation is quickly paying off. An industry-changing regulatory strategy developed by Jay Parkinson of Phoenix Laser Safety, and the recent implementation with the FDA by Kodak has eliminated a major regulatory hurdle in the path of cinema lasers. This dramatic change is the removal of the long-standing “laser light show variance” requirement, where low radiance LIPs are used in cinemas. LIPA is gearing up to address a few other

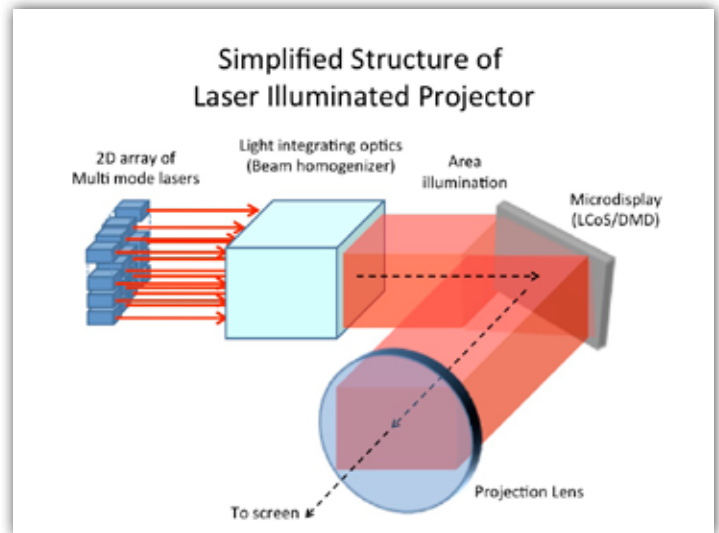


Diagram courtesy of Sony.

regulatory inconsistencies in the coming months, to provide for a uniform user environment and bring lasers to a theater near you in the next few years.

Another application better performed with the use of lasers! See you at the movies! ■

Casey Stack is president of Laser Compliance, Centerville, UT.

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CORPORATE MEMBER PROFILE

LASER SAFETY SYSTEMS

LIA Corporate Member Laser Safety Systems is a laser safety engineering firm located in Williamsburg, VA whose safety engineering experience comes from over 25 years of involvement in the nuclear and Department of Energy laboratory environment. The company is now solely dedicated to safe laser work practices and engineered safety controls.

COMPANY SERVICES

Laser Safety Systems provides a system of modules that are easily combined to form a complete interlock system. These modules can be mounted on the wall surface to permit installation in an existing facility, or they can be mounted within the wall during construction.

As an added service, Laser Safety Systems will provide interlock system layout consultation to architects during building design. It is often advantageous to strategically place conduit and conduit boxes around a laboratory for future laser safety interlock use.

The company also provides insight into other aspects to consider in laser lab layout with respect to door placement, HVAC layout and filtration, water and electric utilities and floor and ceiling materials selection. If your facility needs something special that is not a part of the standard product line, Laser Safety Systems would also analyze your request as they welcome special orders and have in-house CAD/CAM and 3-D CNC capabilities for custom faceplates and printed circuit boards.



Highlights of the company's safety control system:

- Expandable modular system can serve multiple laser tables and multiple doors
- Individual modules work together to form the entire interlock, eliminating the need for a large central control panel
- Remarkable wiring protocol gives each control module complete knowledge and control over the entire interlock state
 - System is hard-wired relay-based for reliability
 - System designed to meet and exceed the requirements of the ANSI Z136 standards for safe laser practices
 - Fail-safe design meets and exceeds the requirements of Article 330 of NFPA 70E (National Fire Protection Association - safety-related work practices for use of lasers)
- System wiring classified by NFPA 70E and NEC as class 1 power-limited, allowing in-wall installation post construction. A

surface wall mounting system is also available.

- All main interlock relays in system are Shrack SR2M safety relays (forcibly guided contacts), certified in accordance with the standards of EN-50205 for use in emergency shut-off machine control.

FOLLOWING ANSI PROCEDURE

The company has a firm belief that engineered laser safety controls should not be an afterthought, nor should they look like an afterthought. Laser Safety Systems' company website explains it like this: "We believe that employees or students surrounded by unsafe conditions are more likely to adopt unsafe behavior. In contrast, those surrounded by clean and well-designed engineered safety systems will know that safety is a priority and are much more likely to work in a safe manner. We believe in a business model that focuses on a single specialty rather than a supermarket approach."

ANSI Z136.1-2007 section 4.3.10.2.2 provides a choice of three control methods for accommodating a class 4 laser area. The first two methods are known as "non-defeatable" and "defeatable" engineered safety controls. The third method, called the "procedural" method, is recommended if, and only if, the first two methods are not feasible or are inappropriate. The procedural method is not an engineered safety control and should only be used for laser systems in the medical field on a live patient where the laser is under the active control of a trained medical professional.

Laser Safety Systems manufactures laser room interlock control systems with capabilities that include cipher keypad defeatable access control systems with or without magnetic lock, electric strike (used by card reader systems) activated defeatable access control and non-defeatable access monitors for doors and curtains.

Laser Safety Systems' modular system design can accommodate defeatable access controls or non-defeatable access monitors with audible and visual laser warning features. Their controlled access solutions include magnetic lock, electronic mortise and electronic strike interface. All systems are ANSI Z136.1-2007 compliant.

In essence, the company's website describes their role in the ANSI standard and laser safety as this: Laser Safety Systems designs each product to meet the requirements of ANSI Z136.1-2007. The versatile modular format of our design is well suited for a simple upgrade of a module if (or when) a future change in the ANSI standard occurs that affects recommended engineered controls. Our standardized color scheme brings safety recognition and purpose to the front of the mind of the laser worker.

Laser Safety Systems is your engineered laser safety solution. For more information, visit www.lasersafetysystems.com. ■



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Many job seekers and employers are discovering the advantages of searching online for industry jobs and for qualified candidates to fill them. But when it comes to making career connections in the field of laser technology, the mass market approach of the mega job boards may not be the best way to find exactly what you're looking for.

The **Laser Institute of America (LIA)** has created the **LIA Career Center** to give employers and job seeking professionals a better way to find one another and make that perfect career fit.



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ASC Z136 UPDATE

CONTENT OF VERTICAL STANDARDS

Dr. Ben Rockwell, chair of standards subcommittee 1 (SSC-1) presented information pertaining to the ongoing development of vertical standards and future revisions of the Z136.1 standard.

As agreed upon by the committee in 2005, only the truly “horizontal,” universally applicable material in the Z136.1 standard will remain: definitions where applicable, classification, MPEs and the very fundamental concepts of control measures. Vertical application standards will deal with user controls in context of the application. As stated in the Z136.1-2007, “Other special application standards within the Z136 series may deviate from the requirements of this standard. Each deviation is valid only for applications within the scope of the standard in which it appears.”

MEMBERSHIP RECRUITMENT

Recommendations from the ADCOM, led by ASC Z136 chair Dr. Bob Thomas, include efforts to enumerate organizations as candidates for membership and, given the venue, a request to ILSC® chairs to approach [ILSC] speakers as potential individual members to the committee. ASC Z136 leaders manned the combined ASC Z136/BLS booth during the ILSC Sponsor Reception; both of which received a substantial number of candidate inquiries. Subcommittee chairs and members were charged with setting subcommittee recruitment goals for the next year. Finally, LIA will continue membership recruitment efforts through mailings, flyers and newsletter articles.

HIGH-POWERED HANDHELD LASERS

Peter Baker broached a subject of growing concern to LIA – dealing with public availability to high-powered handheld lasers (pointers). He cited reports of green lasers with IR-blocking filters removed (producing much higher output powers), as well as green lasers with much higher than labeled powers as reported in *The Dangerous Dark Companion of Bright Green Lasers* (SPIE Newsroom, 10 January 2011).¹

This topic was discussed throughout ILSC, first addressed in the plenary session² and later the featured panel discussion of the Hot Topics Luncheon. Goldwasser et al³ addressed controlling the associated hazards of these handheld lasers.

“In addition to high-power lasers disguised as relatively harmless 5 mW laser pointers, several manufacturers also offer completely portable handheld lasers the size of a flashlight, with output powers of well over one watt. Again, the small size, relatively low cost, unrestricted availability and complete mobility of these devices conspire to both decrease the perceived hazard and increase the difficulty in implementing safety control measures,” explained Goldwasser.

It is anticipated that LIA will promulgate additional information to the public as it becomes available. ■

¹Lead author, Jemellie Galang presented a follow-up poster paper at ILSC entitled “A Green Laser Pointer Hazard.”

²McLin, L.N. (2011) “Dazzling and High-Powered Laser Pointers,” ILSC 2011 Conference Proceedings, Laser Institute of America, Florida, p. 52-59.

³Goldwasser, S.M., Edwards, B. (2011) “Hidden Menace: Recognizing and Controlling the Hazards Posed by Smaller and Lower Power Lasers,” ILSC 2011 Conference Proceedings, Laser Institute of America, Florida, p. 269-274.

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BLS UPDATE

The BLS is a proud supporter of the following events and our CLSOs who are playing significant roles to make them available to you:

SLSC 2011 – the Scandinavian laser-safety event of the year!

This event specifically addresses all laser safety officers having laser safety as a secondary responsibility. This will be a great opportunity to refresh and expand the LSO's knowledge, hear how laser safety at other companies and institutions is carried out, meet fellow laser safety professionals and find out about equipment and services for safe laser use.

Laser safety courses at two levels are offered:

- Basic Laser Safety training, 1 day, Tuesday, June 14
- Advanced Laser Safety training, 2 days, June 13-14

Choose your desired level of participation:

- Conference day, including evening meeting
- Basic Laser Safety course (1 day), from Swedoptronics, in combination with the conference held on June 14.
- Advanced Laser Safety course (2 days), from Bioptica, in combination with the conference held on June 13-14.

Location: Göteborg; Quality Hotel 11 - Eriksbergshallen. Arrive in time to attend the evening meeting on the schooner "Ingo," harbor of Klippan on Tuesday evening.

7th Annual DOE Laser Safety Officer Workshop – This year's LSO Workshop will be hosted by Massachusetts Institute of Technology, Cambridge, MA. The workshop is considered by many to be the premier laser safety workshop in the U.S.

The workshop features presentations on topics not found in standard laser safety training. Solutions to real-world laser safety issues will be discussed with experts in the field. Attendees will receive the most current data on what is happening in laser technology and how to integrate it into a safety culture.

This year's program includes mini-workshops on laser hazard evaluation software, a medical session, discussion of laser safety at production facilities, panels on laser safety and facilities, a presentation on custom laser protective eyewear, several industrial related topics, a review of effective on-the-job training and much more. As a special treat, Jeff Hecht is scheduled to speak.

This workshop also serves as the official annual meeting of the U.S. Department of Energy Laser Working Group (DOE-EFCOG).

Information can be found at www.advanced-laser-safety.com. Please visit the website to view the agenda, link to registration and review housing information.

BLS CM points will be awarded to attendees of either/both events. ■

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LASER INSIGHTS

Laser Insights is a feature to give insight into the very latest developments in laser safety and the possible applications of laser materials processing. These overviews are designed to give you insight into the content and applications of the papers presented at our conferences and workshops. Visit www.lia.org/laserinsights to begin your search.

REMOTE VIEWING NO LONGER A NICE TO DO

by Ken Barat

An underused tool in the laser safety toolbox is the use of remote viewing. By remote viewing I mean being able to observe beam placement and interaction from a location other than bending over the optical table. Industrial applications are familiar and have long used machine vision tools. While in the research laboratory the application of camera viewing systems have lagged behind. Today the availability and cost of cameras to perform this task has greatly improved.

A LASER ALIGNMENT PRACTICAL TRAINING COURSE

by Michael Woods

SLAC National Accelerator Laboratory has developed a Laser Alignment Practical Training Course as one of its core laser safety classes. The course is taught to small groups of up to three students and takes 1-3 hours to complete. This practical course

is not a substitute for site-specific on-the-job training. It does, however, provide a good introduction in core laser safety practices that can be broadly applied. Alignment and diagnostic tasks are performed with low power lasers. Students learn safe alignment and diagnostic techniques and how to avoid common mistakes that might lead to an accident.

DEVELOPING A LASER SAFETY CULTURE

by Ken Barat

While we have come a long way with laser technology, laser safety has lagged in one important area. Still today the most common laser incident is an individual performing some type of beam manipulation and not wearing proper protective eyewear and being struck by a stray or direct beam. The answer is not better eyewear, which would help, nor remote viewing, which would greatly enhance safety, but rather the LSO and their institution and Senior laser users need to spend more time working on changing the user's safety culture, in order to make a significant impact on the number of laser accidents. ■

View complete articles at www.lia.org/laserinsights under the Featured Category.

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JLA UPDATE

The JLA is published four times a year by the LIA in February, May, August and November. It is available electronically to LIA members as a member benefit. To view the journal online, please make sure your membership is current.



The Laser Institute of America has made its official publication the *Journal of Laser Applications*® (JLA), an online-only journal, complete with new features for a broader audience. JLA is hosted on AIP Publishing's robust Scitation online platform, providing the journal with greater functionality and the ability to leverage a wide range of valuable discoverability features. JLA now features eight topic sections, a faster peer-review process and a more functional website (<http://jla.aip.org>) that makes content easier to access and more interactive. Readers will find full-text HTML rendering featuring inline reference links and the ability to enlarge tables and figures by clicking on them. Among the new features are enhanced search functions with more options and better controls to explore returned content with more useful ways.

For non-members of LIA, call the American Institute of Physics at 1-800-344-6902 for subscription information. To receive your JLA table of content e-mail alerts, sign up at http://lia.aip.org/alerting_services/toc_alerts

Research Highlights

Optimization of UV laser scribing process for light emitting diode sapphire wafers

Billions of light emitting diodes (LEDs) are used today in traffic control, automotive headlights, flat panel display technology, mobile devices, back lighting, projection, and general illumination applications. With the dramatic growth in LEDs, manufacturers are looking for technologies to increase production yield and decrease cost.

X-ray investigation of melt flow behavior under magnetic stirring regime in laser beam welding of aluminum

The use of magnetic fields to influence weld bead shape and dilution in laser welding of aluminum alloys was recently suggested. It was already demonstrated for the case of laser welding of hot-cracking sensitive aluminum alloys with silicon-containing filler wire that applying alternating magnetic fields has an impact on the dilution of silicon in the melt pool, yielding a sufficient silicon content throughout the weld and allowing to suppress hot-cracking. However, the interaction mechanisms between the aluminum melt and the magnetic field are still subject of current investigations and are not fully revealed yet.

View complete articles at jla.aip.org.



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MEMBER INNOVATIONS

NEWPORT'S CONTROLLER/DRIVER

Newport Corporation, Irvine, CA, has introduced the new CONEX-AG-M100D, a remote-controllable, piezo-motor-driven mirror mount with an integrated 2-axis absolute position sensor. It combines the high-angular position sensitivity of the field-proven Agilis™ piezo-motor direct-drive technology with exact position information from a patent-pending, 2-axis, absolute position sensor. While other piezo-motor mounts lack exact position information and hence can only be used for adjustments, the CONEX-AG-M100D is capable of repeatable or absolute positioning tasks. This capability is important in scanning applications or when steering a laser beam to different positions repeatedly is required. Visit www.newport.com/M100D for more information.

COHERENT'S LASER ENERGY SENSORS

Coherent Inc., Santa Clara, CA, has expanded its meterless laser measurement concept with a new range of energy sensors in which all meter electronics are miniaturized and integrated within the sensor head cable. Specifically, Coherent's entire range of high performance EnergyMax sensors is now available in this form factor with either RS-232 or USB 2.0 connectivity. This product range enables measurement of the energy per pulse or

average power of pulsed lasers from the nanojoule to the multi-joule level, over wavelengths from the deep ultraviolet through the far infrared, and from single pulses to repetition rates of 10 kHz (with measurement of every pulse). Furthermore, multiple EnergyMax sensors can share a trigger (internal or external) for synchronized operation, such as to enable pulse ratiometry. For more information, visit www.Coherent.com.

BEAM ANALYZER FROM OPHIR

Ophir Photonics, Logan, UT, has introduced the NanoModeScan M2 Laser Beam Propagation Analyzer. NanoModeScan enables the quantitative measurement and viewing of high-power CO₂ laser beams. The system is easy to setup and align; the straight line of sight design means little or no attenuation is required. NanoModeScan is also fast; an M2 measurement can be made in as little as 20 seconds. In addition, the system reports beam waist diameter and location, divergence and the beam's Rayleigh range for each axis. The NanoModeScan's ease of use and fast update rate (up to 20Hz) make it ideal for CO₂ laser-based material processing, machining and marking applications where laser performance needs to be adjusted in real-time. Visit www.ophiropt.com/photronics for more information. ■

MEMBERS IN MOTION

OPHIR LAUNCHES NEW IDENTITY, EXPANDS FACILITY

Ophir Photonics, Logan, UT, has announced the launch of a new corporate branding strategy and expansion of its U.S. manufacturing and distribution facilities in Logan. The new identity and branding strategy were developed to further integrate the company's complete line of laser measurement instruments. Formerly known as the Ophir Laser Measurement Group, these products will now form the core of the new Ophir Photonics Group and also includes the company's range of laser power and energy meters.

Established in 1978, Ophir-Spiricon provides a broad line of laser beam profiling systems for scientific and industrial applications. Products include BeamGage®, laser beam analysis software and ModeCheck™, the industrial CO₂ laser beam profiler. Ophir-Spiricon also holds a number of patents, including Ultracal™, the baseline correction algorithm that helped establish the ISO 11146-3 standard for beam measurement accuracy.

Ophir-Spiricon recently expanded its manufacturing and distribution facilities in Logan. They now are located in a 30 percent larger facility. It features state-of-the-art beam profiling design, manufacturing, testing, service and a state-of-the-art power and energy service and calibration lab. The Ophir Photonics Group also incorporates Photon Inc.'s (San Jose, CA) extensive experience with laser and fiber beam

characterization for solving complex optical problems. For more information, visit www.ophiropt.com/photronics.

LEADING-EDGE TECHNOLOGIES IN AACHEN

The Aachen, Germany-based Fraunhofer Institutes brought together international experts in the areas of manufacture and repair of turbomachinery with the first International Conference on Turbomachinery Manufacturing (ICTM). Almost 200 participants from 11 nations listened with great interest to the presentations of 19 experts from the power generation and aircraft propulsion sectors. The main objective of the conference was to further stimulate the alignment of production trends and product development. The live demonstrations at the two Fraunhofer Institutes were a special highlight. Using examples from repair and manufacture, the research scientists demonstrated how they implement technological innovations and combine them to seamless process chains for industrial use. The direct relevance of the conference for all the branches of industry involved was also reflected in the accompanying industrial exhibition where 11 companies showcased their products and services from the turbomachinery sector. The next ICTM will be held in early 2013. Further information about the conference is available at www.ictm-aachen.com.

LAM 2012

Save the date for LIA's 4th annual Laser Additive Manufacturing Workshop (LAM), which will bring industry specialists, executives, users and researchers from around the world to show how cladding and rapid manufacturing can be applied effectively and affordably to today's manufacturing challenges. This workshop will have a significant impact on the widespread industrial implementations of laser additive manufacturing (cladding, sintering and rapid manufacturing). LAM 2012 will be held at the Sheraton North Houston Hotel, Feb. 29-Mar. 1 in Houston, TX.

LIA NE REGIONAL MEETING

A meeting of the Northeast Chapter of the LIA was held April 20, 2011 in Nashua, NH. This meeting featured a plant tour of PhotoMachining, Inc. – a laser job shop and systems integrator. Many different laser workstations and demos were presented, but in particular – in keeping with the theme of the event – the in-house Lumera Super Rapid laser was shown. This laser is set up for using three different wavelengths (1064 nm, 532 nm and 355 nm) at a 12 ps pulse length and delivered through a galvanometer beam delivery system with accompanying table motion. About 40 people attended the tour and then adjourned to the event hotel – the Crowne Plaza in Nashua.

Over 80 people attended the talks and dinner. In attendance were three past LIA presidents as well as several former and current board members. Some attendees flew in from as far away as California just to attend the event and listen to the talks.

The talks were outstanding and four experts in the field were chosen to each give a 30-minute presentation on their technologies. Paul Graham of TRUMPF spoke about the TRUMPF ps laser and many of the interesting applications for it. Mike Armas of Raydiance Lasers spoke about the 800 fs Raydiance laser and many of its applications. Sidney Wright of RPMC Lasers gave a presentation on the Lumera ps lasers new burst mode technology and the effect on applications. He also spoke about the Jenoptic fs laser, a new laser on the market. Finally, Bill Clark of Clark-MXR gave a presentation on fs laser processing. Clark is considered one of the leading authorities in short pulse processing worldwide.



From left: Mike Armas of Raydiance, Paul Graham of TRUMPF, William Clark of Clark-MXR and Sidney Wright of RPMC.

PhotoMachining sponsored the tour and venue, and introductory remarks concerning LIA were given by Ronald Schaeffer. He also briefly spoke on short pulse laser technology. Schaeffer is CEO of PhotoMachining, a 25-year industry veteran.

LASER MICROMACHINING HOSTED INAUGURAL MID-ATLANTIC CHAPTER MEETING

Two technical presentations on the application of lasers in microelectronic packaging kicked off the inaugural meeting of LIA's new Mid-Atlantic Chapter.

Potomac Photonics, Inc., an LIA Corporate Member, hosted the meeting in their Lanham, MD headquarters on May 24 to a group from academia, industry and government.

Alberto Piqué of the Naval Research Lab in Washington, DC. presented an overview of novel approaches developed at the lab for printing complex materials using laser direct-write fabrication techniques. He also described related work in "lase-and-place" as a method to use lasers in the placement of tiny components directly onto new miniaturized circuit boards.



Paul Christensen and Alberto Piqué

Many people commented on the good opportunity a small regional meeting is for interaction with colleagues. Ted Reutzel of Penn State's Applied Research Lab saw such great value in the meeting he volunteered to host the next meeting at Penn State. All in all, the first meeting was a great success!

PUBS DISCOUNTS

LIA is doing its part to bring down medical costs while providing a safe laser environment for your facility. For a limited time only, LIA is offering **30% OFF** the *ANSI Z136.3 Safe Use of Lasers in Health Care Facilities*, as well as **\$100 OFF FOCAL POINTS – Interactive Training for Medical Laser Safety**.

The ANSI Z136.3 is recognized as the definitive document on laser safety in all health care environments. It provides guidance for the safe use of lasers for diagnostic, cosmetic, preventative and therapeutic applications in any location where bodily structure or function is altered or symptoms are relieved. It is a must for hospitals, medical centers, spas and clinics using lasers.

As a key part of your facility's laser safety program, *FOCAL POINTS* offers a user-friendly training program that medical laser safety officers can use to effectively train their staff. Considering the wide variety of laser applications and their increasing role in health care, it is vital that health care professionals understand fundamental information regarding lasers and their safe use, all of which is covered by *FOCAL POINTS*.

Now is the time to invest in the foundation of a successful laser safety program! To order either publication at the discounted price, visit www.lia.org/store. Use discount code: PSC0411. ■



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