

THE OFFICIAL NEWSLETTER OF THE LASER INSTITUTE OF AMERICA

LIA TODAY

Volume: 21 No: 3
MAY/JUNE 2013



**CHALLENGES OF THE
MEDICAL LASER SAFETY
OFFICER**

PG 6

**LIA – 45 YEARS PREPARING
YOU FOR THE DEMANDS OF
LASER SAFETY**

PG 8

**ILSC 2013: EXPERTS MEET
TO SHARE LASER SAFETY
IMPROVEMENTS**

PG 12

FOCUS:
Laser Safety

Laser Institute of America is the international society dedicated to fostering lasers, laser applications and laser safety worldwide.

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**Laser Institute
of America**

Laser Applications and Safety

IN THIS ISSUE:

FEATURES

Challenges of the Medical Laser Safety Officer	6
LIA - 45 Years Preparing You for the Demands of Laser Safety	8
ILSC 2013: Experts Meet to Share Laser Safety Improvements	12
Laser Pointer Characterization and Evaluation at NIST	18
LASER World of PHOTONICS 2013 Provides Photonic Industry with Upswing	20

DEPARTMENTS

Calendar of Events	2
Executive Director's Message	5
President's Message	5
Corporate Member Profile	24
ASC Z136 Update	25
BLS Update	26
Laser Insights	27
JLA Update	28
Members In Motion	29
Member Innovations	29
New Corporate Members	29
LIA Announces	30

ADVERTISERS

ANSI Z136.2	16
ANSI Z136.3	27
ANSI Z136.8	23
Board of Laser Safety	26
CMLSOs' Best Practices	23
EFESTO, LLC	19
ICALEO 2013	28
IPG Photonics Corporation	32
Kentek Corporation	3
Laservision USA	17
LIA's CO ₂ MLSO Online Training	7
LIA's EVALUATOR	19
LIA's In-house Laser Safety Training	11
LIA's Laser Safety Awareness Online Training	11
LIA's Laser U	4
LIA's LSO Training for R&D	25
LIA's Medical Laser Safety Awareness Online Training	7
LME 2013	22
PennWell (ILS)	21
PhotoMachining, Inc.	10
Photonics Media	23
TRUMPF, Inc.	31

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 +1.407.380.5588, or send material by email 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.

CALENDAR OF EVENTS

Laser Safety Officer Training

Dec. 3-5, 2013 Orlando, FL

Laser Safety Officer with Hazard Analysis*

Oct. 7-11, 2013 Miami, FL

Nov. 4-8, 2013 Los Angeles, CA

*Certified Laser Safety Officer exam offered after the course.

Laser Safety Officer Training for R&D

Aug. 13-15, 2013 Orlando, FL

Industrial Laser Safety Officer Training

Jul. 16-17, 2013 Novi, MI

Medical Laser Safety Officer Training*

Oct. 5-6, 2013 Miami, FL

Nov. 2-3, 2013 Los Angeles, CA

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

International Congress on Applications of Lasers & Electro-Optics (ICALEO®)

Oct. 6-10, 2013 Miami, FL

Lasers for Manufacturing Event (LME®)

Sept. 11-12, 2013 Schaumburg, IL

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PRESIDENT'S MESSAGE



Dear LIA members, friends, colleagues and readers of the *LIA TODAY*,

After the long winter in the northern parts of the country, the spring has now arrived. The warm sun and the blooming nature is now fueling the optimism and creativity that is necessary to overcome the still difficult business situation around the globe.

The LASER show in China was eye opening, not only for me. The event grew by more than 25 percent in occupied space and grew

by visitors as well. The surprise is, on one hand, the huge number of unknown laser and laser systems manufacturers in the "western world" and on the other hand, the way the Chinese domestic laser industry is dealing with laser safety. Either we are wrong in our judgment concerning laser safety or there is a big need for laser safety education in China. This *LIA TODAY* issue focuses around laser safety.

Also, more or less related to the situation in Asia, laser pointer characterization is another featured topic. There is not one day that passes by without an incident with a laser beam – from a laser pointer – creating a dangerous situation with air traffic. If it is done the right way, the following is possible: One of the strongest "laser pointers" available, a 400W green laser, has just been used to show the way to an opening ceremony of a new laser R&D center in Germany. No dangerous situations with the air traffic occurred, just a few calls to the police stations about a UFO in the area.

Only two months after the LASER World of PHOTONICS CHINA event, the 21st LASER World of PHOTONICS took place in Munich. This event celebrated its 40 year history, starting in 1973 with the first event in Munich. The main leading suppliers have already indicated that they will show ground breaking new laser products. Some of these products will lead to even more new and exciting applications.

What is coming up?

ICALEO® 2013 is coming closer, thanks for submitting your papers. It will be another exciting event from Team LIA, showing new technology and possibilities to make you and your business fit for the future.

I wish you good health, success in your business and hope to see you at one of the LIA sessions or events.

Yours,

Klaus Löffler, President
Laser Institute of America

EXECUTIVE DIRECTOR'S MESSAGE



In March, LIA hosted our International Laser Safety Conference (ILSC®) in our hometown of Orlando, FL. In addition to the excellent and comprehensive program, which you can read about on pages 12-16 in this issue, we hosted meetings of the ANSI and IEC standards committees, which help move the revisions of standards and preparation of new ones along.

This year, the valuable work was impacted by the government sequester, which prevented many of the key individuals from attending. Nonetheless, ASC Z136 Chair, Bob Thomas and ILSC General Chair, Ben Rockwell made the necessary adjustments so that overall success was achieved.

Our thanks to all the conference chairs and subcommittee chairs for a job well done!

Peter Baker, Executive Director
Laser Institute of America

CHALLENGES OF THE MEDICAL LASER SAFETY OFFICER

By June Curley

As a perioperative nurse working in the operating room of a Level 1 trauma center, I want to share some of the challenges of implementing a laser safety program and inspire new Laser Safety Officers (LSOs) to develop systems that will assist them with enforcing laser safety compliance.

First, I recommend Medical Laser Safety Officer Training and taking the Board of Laser Safety (BLS®) medical certification exam. Being a Certified Medical Laser Safety Officer (CMLSO®) validates not only our knowledge, but also our commitment to laser safety. Then, utilize all the available resources: ANSI Z136.3, AORN Standards and Recommended Practices, books on lasers by Dr. Kay Ball and publications referencing eye protection or best practices offered by the Laser Institute of America.

Next, form a committee. Our committee includes the Vice President of Surgical Services, a physician, an anesthesiologist representative, nurse managers, the employee health nurse and a biomedical engineer. Together we made a plan to meet quarterly, review the laser policy, create competencies for each laser and decide who the laser users would be – RNs, Surgical Techs or both. For logistics, we decided it would be the RN circulator. The responsibilities of the LSO were defined to include training and education, monitoring policy compliance, resolving non-compliance issues and chairing laser safety committee meetings.

Over the past recent years, I found many challenges while organizing the laser program. I began by taking inventory of the lasers and listing them on a spreadsheet which identified their manufacturer, year of manufacture, model and serial number and preventative maintenance due date. The lasers were further identified by wavelengths with each assigned a color code. For example, the CO₂ lasers were assigned the color blue. Blue instrument tape was then applied to the front of the laser and all of the CO₂ accessories including signs, protective eyewear, keys and CO₂ laser log books. The accessories, except for the keys, are stored in a CO₂ laser accessory cart. The keys are attached to blue key chains and are stored in a locked box in the control office.

It is an extra burden for laser operators to document in a laser log book as well as in the electronic medical record, but necessary in the event of an audit by a regulatory agency. The laser operators at Tampa General Hospital are also the circulating nurses. As such, our policy states that when the laser is activated, the operator will have no competing responsibilities. If a laser operator needs to answer the phone or a pager, or if they need to leave the room, the laser will be placed on standby.

Other issues that we have dealt with include keys left in lasers and inappropriate laser signs, such as a paper towel with the word “laser” handwritten on it. Although seemingly minor in nature, fines imposed by OSHA, of up to \$5,000 for each of these occurrences, could result. Solutions implemented include taping Velcro to the back of the laser signs to promote easy placement on the door and a log that must be signed off by the laser operator documenting that the keys have been returned to the locked box.

Another issue surfaced when we discovered a variance between the instructions provided by the vendor representative and the instruction manual that came with a new laser. The laser rep told the surgeons that eye protection “really wasn’t necessary.” A phone call to the manufacturer validated that indeed eye protection was required and the vendor rep was re-educated by his company.

A lesson learned along the way was to create a safety checklist that included checking the eye protection filter used with a microscope. A brief back flash occurred, fortunately without injury, when the filter’s cable was not connected to the laser. Our checklist should preclude this in future cases. In addition, I later learned from an engineer during a coffee break at the 2009 International Laser Safety Conference (ILSC®), that a simple safety interlock could be installed on the laser to prevent this from happening in the future. I cannot overemphasize the value of networking at these conferences!

Recently, with the collaboration of the Department of Anesthesia, we have developed *Laser Airway and Fire Management Guidelines*. These guidelines were laminated and attached to each anesthesia cart. They were then presented at a joint OR staff/anesthesia in-service on Laser Airway Safety. Yet another recent development was the recruitment of laser operators to act as laser “super users.” In exchange, they receive clinical ladder credit for being an expert resource for the staff.

In conclusion, laser challenges will always arise. Develop systems to keep lasers and laser safety on track. Listen to your co-workers and welcome their feedback; some of the best suggestions come from them, for example, the idea of color-coding the lasers. By listening, we empower a sense of making a difference. Model desired behavior for your staff and be there to listen and support them.

If you care at all, you’ll get results. If you care enough, you’ll get incredible results. ■

June Curley is a nurse and Certified Medical Laser Safety Officer at Tampa General Hospital.



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LIA — 45 YEARS PREPARING YOU FOR THE DEMANDS OF LASER SAFETY

By Geoff Giordano

The presence of so many attendees wearing red Certified Laser Safety Officer (CLSO®) and Certified Medical Laser Safety Officer (CMLSO®) ribbons at the International Laser Safety Conference (ILSC®) in Orlando, served as a clear indicator that the ranks of certified laser safety professionals are growing. And their job is going to be increasingly demanding as photonics expand into more advanced applications in aviation, energy, medicine, defense and manufacturing.

“We train about 1,000 laser safety officers a year,” noted LIA Education Director Gus Anibarro. But that’s just the tip of the iceberg when considering the enormity of the task ahead for companies and research facilities making an intensive use of lasers and trying to ensure the safety of their personnel.

Consider Boeing: With 170,000 employees, only about 70 are LSOs – and three are CLSOs – according to Dr. Denny Rossbach, CLSO for directed energy systems radiation safety.

Because the ranks of the laser safety community are relatively small, the number of hats an LSO might wear in his or her role is considerable. LSOs might also be asked to serve as radiation safety officers, environmental health and safety managers or industrial hygienists, for example. As those roles evolve, so do lasers, the standards regulating them and the resources that allow them to be used safely.

TRAINING RESOURCES

Busy LSOs don’t have time to reinvent the wheel when it comes to training laser users. The most effective education offers extraordinary convenience and personalization. Onsite and online options are critical to training large numbers of people who might be working different schedules or in different facilities.

THE TRAINING WE’VE BEEN DOING ONLINE IS ABOUT AS FORWARD AS YOU CAN GET.

“The training we’ve been doing online is about as forward as you can get,” Anibarro says. In terms of teaming with companies that host the training, “we’ve been doing that way longer than anyone else.” LIA’s industrial and medical training has been facilitated at industry-leading firms like IPG Photonics and Coherent, which

provide classrooms for the training. And more such courses are scheduled, including potential visits to Stanford University and Canada. “We’ve been going to Northwestern Memorial (Hospital in Chicago) for years,” Anibarro notes.

In short, in these days of financial austerity and barebones staffing, “the future of training is ultimate flexibility,” he says. In the past couple of years, LIA and other organizations have been aggressive in creating highly customizable online courses laser professionals can take at their convenience from anywhere in the world.

For example, LIA’s recently launched “Laser Safety Awareness Training” course allows one or more users to complete a two-hour program at a pace ideal for them. Newly appointed LSOs can take the course first, then purchase multiple “seats” at a discount to ensure their employees are fully apprised of the guidelines set forth in the parent ANSI Z136.1 *Safe Use of Lasers* standard. Users have three days to complete the course and receive a certificate when they do. Such classes are particularly ideal for personnel who cannot travel for work purposes.

Since LIA is the secretariat of the Z136 standards, its courses are cutting-edge companions to these guidelines as they are revised. At the beginning of May, LIA launched a medical version of the laser safety awareness course based on the recently updated Z136.3 standard for the *Safe Use of Lasers in Health Care*. Meanwhile, the new Z136.8 standard for the *Safe Use of Lasers in Research, Development, or Testing* that was released last year also has spawned a class geared to teaching the specifics of guidelines relating to the highly fluid lab environment.



LIA is also continuing its participation in the alliance program of the US Occupational Safety and Health Administration (OSHA), through which LIA has been providing progressive laser safety training to workers since 2005. Anibarro trains federal workplace compliance officers in laser safety — and they are quite grateful.

“With this last group (in Arizona), I opened their eyes,” Anibarro recalls, noting that Arizona has its own OSHA. “Arizona has stringent laws regulating lasers, particularly in medical facilities. I started telling them about the laws in Arizona, and they were surprised.”



As part of the alliance, “our agreement is for us to produce laser safety products,” he says. Within the year, LIA will make available several OSHA-approved online publications that will address the 10 steps to creating a medical or non-medical laser safety program, the 13 questions an OSHA compliance officer will ask and an introduction to lasers.



When more in-depth study is an option, books such as LIA's *CLSOS' Best Practices in Laser Safety* or *CMLSOS' Best Practices in Medical Laser Safety* fit the bill.

POWERFUL PRODUCTS

In addition to training, products that ensure personal protection for laser personnel evolve along with laser powers, wavelengths, work environments and ever-more-advanced applications.

A prime example is at the Orion physics research facility in Aldermaston, UK. At ILSC 2013, Steve Melton detailed the facility's comprehensive improvements to workplace safety.

“We are identifying all the time things we can do to improve the facility and increase our capability,” he said. “We intend to keep benchmarking ourselves against the best of these kinds of facilities around the world (and) continue attending forums like this to learn and ensure that the way we operate is the best it can be.”

Among the many improvements the Orion facility has instituted:

- RFID identifiers on lanyards to keep track of critical access keys that are part of a complex system required to energize and fire the laser.
- Newly partitioned areas of the facility.
- A turnstile at the entrance to the target hall that is operated both by an electronic swipe card and a personal access key.
- A sign that alerts personnel that they are not wearing goggles. When protective eyewear is not being worn, the message “Not Wearing Goggles” is visible; with goggles on, the message becomes invisible.

“Another thing we've discovered along the way: We've become a tourist attraction,” Melton noted. “As the facility is being run up, we've had more and more visits from VIPs in government and in the UK Ministry of Defense. Our viewing galleries have become busy. Originally we designed them with a set of blinds that went up and down to protect anybody from stray laser light.” But with the increasing interest, laser-protective glass has been installed over the clear glass windows to allow the blinds to stay

up during alignment operations. The blinds must still be lowered for target shots.

Those kinds of improvements are what keep companies like Laservision USA busy. Based in St. Paul, MN, Laservision USA has been rolling out a variety of products since late last year, including a unique active window for industrial applications that shuts down a laser when struck directly by the beam. The company also launched laser-safe gloves, “featuring a certified resistance of 40 kW/m² against laser radiation of 1064 nm wavelength before exceeding the MPE Skin-Value,” according to the website.

Available in two sizes, the windows are geared to high-powered laser wavelengths between 820 and 1100 nm. While the active windows are geared primarily to safeguarding automated processes, mainly in the automotive industry or shipyards, humans also benefit. In some instances, lasers have gone through walls, says business development manager Serdar Guvenc.

The laser-safe gloves, made with bamboo thread, are certified for diode and Nd:YAG in the same range. “Cut-resistant glass fibers and abrasion-resistant polyamide guarantee optimum mechanical protection,” according to Laservision. The fingertips and palms are coated with a high-performance elastomer to protect fragile optics.

AUDITS CAN BE SURPRISING

Keeping on top of a facility's inventory of equipment is also essential to ensuring safety — another moving target to contend with for LSOs. That's why in addition to onsite courses, LIA offers onsite audits.

“I was at one facility in Indiana, and I was walking down their line,” Anibarro recalls. “They had a punch press, an arc welding machine, a water jet machine, and then they had the laser, and you didn't know what it was unless you worked there. The average person walking down there who is not an employee or who didn't work with these things would not know.”

It is not uncommon for lasers to go unaccounted for. “There have been several times I've done an audit of a facility and found a laser they didn't even know they had,” Anibarro says. For example, “I might find out they have a Class 3B or 4 used for marking product codes. When I went in there to look at the laser welder, they forget that they had a marking laser. Nobody really knew to take a look at it. It's the same in hospitals; we find a laser they didn't know they had because a sales rep was loaning it to the hospital. It wasn't a rental laser, and the hospital didn't own it, and the LSO was unaware until I showed up.”

BEYOND PROFESSIONALS: THE PUBLIC

Advances in smaller, more powerful, hand-held devices – not to mention laser pointers – mean the general public could be increasingly exposed to potentially harmful wavelengths. When prescribed for home use, therapeutic lasers, such as biostimulators, present still more challenges.

For example, a physician might prescribe to a patient who has rheumatoid arthritis a laser for treatment of acute pain. While it is unclear how this therapy works, what is clear is that the patient now has a class 3B laser in his home. The guidelines for use of the device are clarified in the ANSI Z136.3 *Safe Use of Lasers in Health Care* standard.

According to ANSI Z136.3 Section 4.3.7: Lasers or laser systems used for home health care can present atypical situations requiring unique control measures. When possible, the laser product should be designed to preclude ocular exposure above the MPE during operation, maintenance and under reasonably foreseeable misuse. If the laser or products cannot be designed to preclude such exposure, the manufacturer or dispenser of the laser product shall provide the user with training and/or clear, plainly written procedures for safe use. In such cases, the standard indicates, users shall assume full responsibility for personal safety as well as the safety of any others in the vicinity of the device.

“There are home health care laser products that are at least Class 3B,” Anibarro says, “so we have to give guidelines on how to use them safely. The rental company tells you that you are taking home a laser that is considered hazardous and you need to learn more about safety in order not to injure yourself or somebody else.” That is when the home user needs to reach out to the experts. “Will the general public buy the guidelines? Only if they are made aware that there is a hazard and seek training. It’s more of an education campaign with the home user because there is no regulatory body.”

That is why laser safety trainers need to be ready to guide users at a moment’s notice. “I’ve gotten a call once in regard to a home-use laser,” Anibarro notes. “The individual bought the laser for treatment of his wife, and he wanted to know what the hazards were.”

He has even fielded queries from gun owners who purchase laser sights. “Manufacturers put LIA’s phone number in their literature,” Anibarro says. “I get calls from people who buy laser gun sights and ask how to attach or align them.” Such devices range up to Class 3R, like pointers.

MANUFACTURERS PUT LIA’S PHONE NUMBER IN THEIR LITERATURE.

When that kind of one-on-one contact isn’t possible, online resources — such as LIA’s podcasts — offer immediate guidance.

With all these options available, the savvy LSO can create just the right mix to ensure the safe use of lasers. As recent developments make clear, the most effective training is highly personalized, and the makers of laser safety products are responding to the ever-changing capabilities of photonics devices. ■

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ILSC 2013: EXPERTS MEET TO SHARE LASER SAFETY IMPROVEMENTS

By Geoff Giordano

The tight-knit laser safety community made an impressive showing at the Laser Institute of America's biennial International Laser Safety Conference (ILSC®) by stepping up to help fellow attendees hampered by the federal budget sequester.

Many participants, including four-time General Chair Ben Rockwell, had to pay their own way, use vacation or personal time, or ask fellow experts to deliver their presentations. But the nearly 200 attendees who found a way to make the trip were treated to a stellar program at ILSC 2013, held March 18-21 in LIA's home base of Orlando, FL.

Participants from around the globe took in a smorgasbord of safety topics ranging from surgical plume management and advanced medical applications to electrical safety and laser lab design to reviews of laser accidents and the lessons learned. Held concurrently with a full week of meetings by laser standards committees and punctuated by a host of networking events, ILSC 2013 deftly balanced technical and practical information through 80 presentations and plenaries.

"You needed at least two people to cover all the useful presentations," said Dr. Denny Rossbach, Certified Laser Safety Officer (CLSO®) at Boeing. ILSC 2013 offered "a lot of very current and important information, a preview of the upcoming changes in the standards and a lot of international participation."

Offering a wealth of real-world experience from the prime movers behind current and evolving laser safety standards, guidelines and procedures, was the goal of Rockwell and his session chairs.

"It came together excellently," Rockwell said. "This is one of the best ILSCs. I really enjoyed the breadth of topics we had this time. We had a lot of different speakers addressing different kinds of light sources, the ways to use lasers and advanced laser systems."

ILSC 2013 demonstrated a unity of purpose and a particularly noticeable level of collegiality — often demonstrated by speakers addressing audience members on a first-name basis when answering their queries. Freewheeling panel discussions and even a come-one-come-all networking lunch for university and academic affiliates emphasized attendees' willingness to share war stories from the field in hopes of helping their peers tackle safe-use issues.

"The membership and the LIA staff came together and did a magnificent job to put on another absolutely fantastic program," enthused Ben Edwards, chair of the two-day Technical Practical Applications Seminar (TPAS) and the radiation safety officer for Vanderbilt University. The "many last-minute heroics" that overcame hurdles presented by the sequester "demonstrates the strength of the laser safety community. Laser safety is a very

shallow pond; there aren't that many laser safety specialists in the United States or in the world. ILSC generates not only knowledge but documentation." The proceedings convene "a group of people who are more knowledgeable when they leave, and that knowledge can disseminate outward."

ILSC GENERATES NOT ONLY KNOWLEDGE BUT DOCUMENTATION.

PRESTIGIOUS PLENARIES

Opening the proceedings was a keynote address examining the FDA's vigorously expanding laser research as detailed by Daniel Hammer, deputy director of the Division of Physics at the Center for Devices and Radiological Health. He described numerous projects studying optical diagnostics, biosensing, bioimaging, laser-tissue interaction, medical device surface contamination and laser safety.

In one FDA project, an ultrashort-pulse laser is used to etch anatomically accurate features into a retinal phantom for "characterization and calibration of OCT imaging systems," Hammer said. In terms of safety, he noted the agency is particularly interested in monitoring laser pointers and laser projectors for light shows. They "work with manufacturers, who submit variances. The FDA reviews and issues about 10 to 20 variances a month when these light projectors exceed the 5 milliwatt standard in the visible spectrum."

The FDA also has its eye on femtosecond lasers, prevalent in LASIK and cataract surgery and emerging in dentistry, cancer therapy, drug development and neurology. "We have a few projects in this area," Hammer noted, including one focused on "second-harmonic and third-harmonic generation in corneal tissue."

Next, Dr. Eric Van Stryland, first dean of Orlando's CREOL, The College of Optics and Photonics, explained CREOL's success as the first such institution in the US. Van Stryland was introduced by Rockwell as a pioneer in nonlinear optics who has graduated more than 31 PhDs and is on the ISI's list of most-cited researchers. The University of Central Florida not far from LIA headquarters, has produced what Van Stryland called the shortest known laser pulse — 67 attoseconds, or 67 billionths of a billionth of a second — letting researchers see electrons moving around nuclei "and stop the action."



Not long before ILSC 2013, Van Stryland said CREOL installed a \$500,000 Coherent laser “that puts out 12 millijoules at 40 femtoseconds — that’s near a terawatt of peak power that runs at a kilohertz.” The implied safety issue with the device helped illustrate CREOL’s Z-scan spectroscopy project, in which femtosecond laser output can be used to produce a broader-spectrum white-light continuum of which any 50 nanometer bandwidth could damage the eye. “You have to make sure you know where the beams are. What we have been doing over the years is working on methodologies to make passive optical sensor protection devices.” Inspired by the workings of photochromic sunglasses, “we work on things that will change in less than a billionth of a second to protect your eyes.”

FROM THE TRENCHES

ILSC 2013 served up example after example of actual successes and failures in laser programs, procedures, projects and facilities large and small. From laser alignment injuries or surgical airway fires to the increasing challenges facing Laser Safety Officers (LSOs) daily, attendees got a powerful glimpse into laser issues in various fields.

Particularly gripping were dire accounts of major accidents recounted during the Medical Practical Applications Seminar (MPAS), chaired by Vangie Dennis. Also disturbing were tales of repeated instances of apparently mislabeled — or unlabeled — lasers and laser systems.

Dennis acknowledged relying heavily on the decades of experience shared by MPAS presenters Patti Owens, founder of AestheticMed Consulting, and Leslie Pollard, owner of consulting firm Southwest Innovative Solutions.

Pollard enthusiastically delivered a picture of the future of laser-based medicine, including virus detection, injections with laser “needles,” laser “tweezers” to analyze cancer cells, photoacoustic laser pulses to detect melanoma cells before tumors form, and an expanding repertoire of diode laser human and veterinary therapies.

“Isn’t it incredible that we’re right next door to these guys (who are working on such advances)?” she asked. She later noted that she is seeing devices born of collaboration by optics specialists, electrical engineers and physicians “pulling the medicine together to get the best of the best of all the worlds: of the electronics, the photonics and the application. We know so much more about tissue now than we did before. We’re talking about medicine on a molecular level — finally.”

While those new applications and smaller, more powerful lasers will raise new safety challenges, Dennis surveyed a host of startling safety issues prevalent in today’s operating rooms and how to prevent them. “Just when you think you’re doing a good job, the games and the rules change,” she said, noting fire dangers from alcohol-based preps, petroleum lubricants,

plastic corneal protectors, PVC in tracheal tubes, even the color in the lettering on surgical tubing or lint from drapes and towels. “The myth that hospitals don’t burn is not true.” Such incidents have prompted new head, neck and chest protocols in ANSI and AORN guidelines.

During the TPAS session reviewing laser accidents and knowledge gleaned from them, a panel of industry veterans offered their experiences. One, Greg Makhov of Orlando’s Lighting Systems Design, volunteered details of an eye injury he suffered while servicing a 20-watt argon laser. Leaning through an upwardly reflected beam, his first reaction was “kind of like slipping with a razor knife: ‘I could have avoided this if I had just taken an extra moment.’” No retinal bleeding was found; he later measured the beam power of the device at 60 milliwatts. “This absolutely will (hurt you), and it doesn’t take a lot of power. Tens of milliwatts will do the job. It took three visits to my ophthalmologist before he was able to see the damaged site. Could I have avoided it? Yes ... I could have left my goggles on for another two minutes.”

THE SCIENCE OF SAFETY

Running in parallel to the Practical Applications Seminars, were the Laser Safety Scientific Sessions (LSSS) overseen by Chairperson Dr. Karl Schulmeister of Austria’s Seibersdorf Laboratories. Sessions ran the gamut from speculation about the need for a Class 5 designation to measuring bioeffects, proper signage, temporary visual impairment from LEDs in toys, new lab safety procedures and other hands-on guidance.

The growing hazard of laser pointers being aimed at pilots and drivers received a significant amount of research attention. In a study that drew national interest, Josh Hadler of the National Institute of Standards and Technology (NIST) unveiled data showing that 70 percent of 122 randomly selected Class 3R pointers failed to meet their certification criteria. Explaining how to create a compact and inexpensive testing apparatus, Hadler said NIST research found excessive visible (532 or 650 nm) or infrared (808 or 1,064 nm) emissions from about 90 percent of the green pointers and about 44 percent of the red pointers.

Later, in the first-ever ILSC series on glare and dazzle, Dr. Craig Williamson detailed an artificial retina model developed in the UK that dramatically replicates the degradation in the eye’s ability to distinguish objects when subjected to increasing laser irradiance.

In his opening plenary, the FDA’s Hammer noted the increasing prevalence of green laser pointers. “The technology is a diode-pumped solid-state laser, and it’s really amazing the advances that have occurred in the past couple of years,” he said. “What 10 years ago was something that would be on a bench top is now handheld and costs less than \$20. They have demonstrably poor manufacturing practices.” With the FAA reporting double the reported pointer incidents from 2009 to 2012, Hammer

(Continued on page 16)

ILSC CONFERENCE CHAIRS



ILSC CONFERENCE GENERAL CHAIR
BENJAMIN ROCKWELL



ILSC 2013 LASER SAFETY
SCIENTIFIC SESSIONS (LSSS)
CHAIR KARL SCHULMEISTER



ILSC 2013 MEDICAL PRACTICAL
APPLICATIONS SEMINAR (MPAS)
CHAIR VANGIE DENNIS



ILSC 2013 TECHNICAL
PRACTICAL APPLICATIONS
SEMINAR (TPAS) CHAIR BEN
EDWARDS

ILSC OPENING PLENARY



LIA DIRECTOR OF CONFERENCES,
GAIL LOIACONO, WELCOMES THE
ILSC CONFERENCE AND SESSION
CHAIRS



PLENARY SPEAKER DANIEL HAMMER ADDRESSES
EXAMINING THE FDA'S VIGOROUSLY EXPANDING
LASER RESEARCH



PLENARY SPEAKER ERIC VAN STRYLAND PRESENTS
AN OVERVIEW OF THE COLLEGE OF OPTICS AND
PHOTONICS (CREOL)

2013 AWARD WINNERS



LIA EXECUTIVE DIRECTOR, PETER BAKER, PRESENTS THE 2013 GEORGE M. WILKENING
AWARD TO BRUCE STUCK AND DAVID (JACK) LUND



ROY HENDERSON ACCEPTS THE 2013 R. JAMES ROCKWELL JR.
EDUCATIONAL ACHIEVEMENT AWARD

ILSC SESSIONS



THE ILSC OPENING PLENARY SESSION WAS WELL ATTENDED AND RECEIVED POSITIVE FEEDBACK FROM THE ATTENDEES



ATTENDEES WERE ENGAGED DURING THE PRESENTATIONS AT ILSC

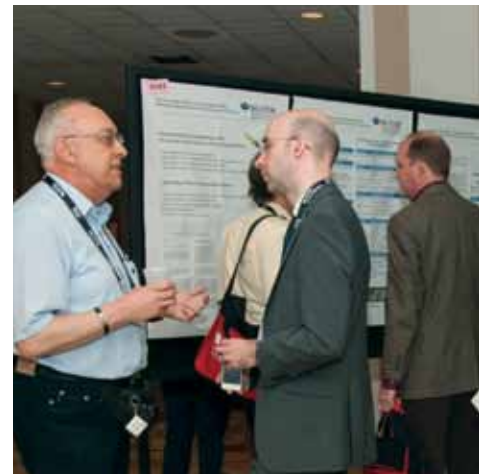
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NETWORKING





said the FDA tested 15 devices and found excessive power up to 60 milliwatts in the green. He said the agency banned all pointers at the port of entry, drafted guidances for laser toy manufacturers, “and we’ve also just briefed Congress.”

SETTING NEW STANDARDS

Before ILSC even got under way, the Accredited Standards Committee (ASC) Z136 convened for a full day of review of progress across the range of ANSI Z136 laser safety standards. ILSC offered an ideal opportunity to rub shoulders with the pacesetters in the laser safety community, including those involved in shaping draft versions of a standard for manufacturing and another for lasers in entertainment, displays and exhibitions. “We want to make sure that the levels we set to protect people are reasonable and the controls we put on people are reasonable,” said Rockwell in his opening remarks. IEC and Z136 standards, like the new ANSI Z136.8 *Safe Use of Lasers in Research, Development, or Testing*, were the underpinning of several presentations throughout ILSC 2013. For the closing plenaries, Rockwell slated a set of five “hot topic” discussions that included updates on the upcoming revisions of the parent Z136.1 and IEC 60825-1 standards.

Bill Ertle, chair of the Z136 Technical Subcommittee on Control Measures and Training, walked attendees through changes proposed for each section of the next edition of Z136.1, which is being readied for release by fall or early next year.

“We are trying to standardize across all the Z136 series, as well as with other standards domestically and internationally,” said Ertle, also president of ILSC platinum co-sponsor Rockwell Laser Industries.

Changes include revised units of wavelength measure, renumbered tables, new definitions and inclusion of optics transmission in hazard classification of lasers. The completely rewritten section on control measures proposes requiring eye protection for Class 3B devices as opposed to simply advising such measures. Also, the draft proposes 100 seconds as the time base for selection of eye protection for UV intrabeam exposures. The section on non-beam hazards will be completely overhauled as well.

ICING ON THE CAKE

Amid the very serious business of advancing laser safety, ILSC 2013 participants were able to engage in a little fun and relaxation, thanks to a casual welcoming reception and raffle, an awards luncheon and an informative vendor reception.

LIA Executive Director Peter Baker awarded Roy Henderson the R. James Rockwell Jr. Educational Achievement Award, while former coworkers David Jack Lund and Bruce Stuck earned the George M. Wilkening Award in Laser Safety.

All in all, ILSC “went very well,” said Schulmeister. “We knew we had a great program.” First-time attendees were particularly impressed.

“The meeting was very informative,” said Wendy Woehr of North Carolina, who paid with her own funds to attend. “I was recently promoted and became laser safety manager for the research lasers and medical lasers at Duke. I am studying to take the CLSO exam. I came to the conference with several questions, and they were all answered. It was worth every penny, and I am looking forward to the next one.”

Michael Ranallo of TRUMPF in Cranbury, NJ, noted that “meeting other colleagues and research personnel gives a fresh perspective outside the confines of my day-to-day workplace. Exchanging ideas outside the sessions was also beneficial because of the different views offered, whether they applied to my situation or not. The presenters were obviously well-prepared and gave informative and intelligent presentations.” ■

To purchase ANSI Z136 standards or ILSC proceedings, visit www.lia.org/store.

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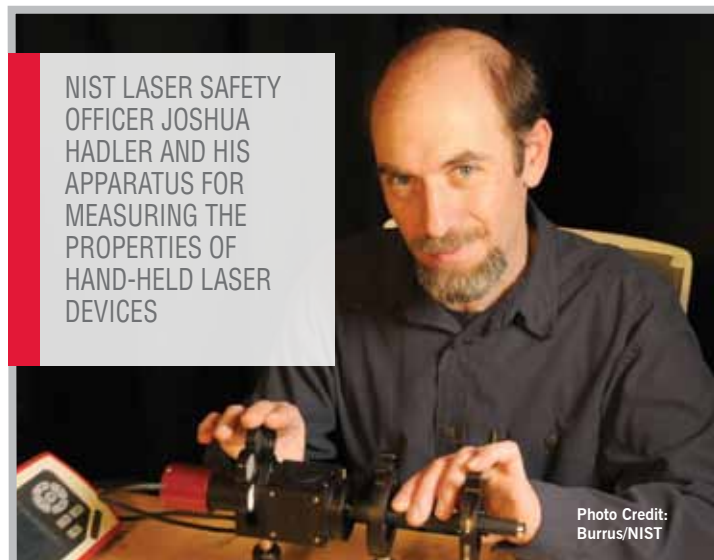
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LASER POINTER CHARACTERIZATION AND EVALUATION AT NIST

By Joshua Hadler

Using a low-cost apparatus designed to quickly and accurately measure the properties of hand-held laser devices, National Institute of Standards and Technology (NIST) researchers tested 122 laser pointers and found that nearly 90 percent of green pointers and about 44 percent of red pointers tested were out of compliance with federal safety regulations. The NIST test apparatus was designed so that it can be replicated easily by other institutions.



As NIST researchers reported at LIA's International Laser Safety Conference (ILSC®) on March 20, 2013,¹ both red and green laser pointers often emitted more visible power than allowed under the Code of Federal Regulations (CFR), and green pointers often emitted unacceptable levels of infrared light as well.

Anecdotal reports of green laser hazards have previously appeared in scientific journals and the media, but the new NIST tests are the first reported precision measurements of a large number of hand-held laser devices. The NIST tests point out that many red laser pointers are also—unexpectedly—out of compliance with federal regulations. “Our results raise numerous safety questions regarding laser pointers and their use,” the new paper states.

The NIST tests were conducted on randomly selected commercial laser devices labeled as Class IIIa or 3R and sold as suitable for demonstration use in classrooms and other public spaces. Such lasers are limited under the CFR to 5 milliwatts maximum emission in the visible portion of the spectrum and less than 2 milliwatts in the infrared portion of the spectrum. About half the devices tested emitted power levels at least twice the CFR limit at one or more wavelengths. The highest measured power output was 66.5 milliwatts, more than 10 times the legal limit. The power measurements were accurate to within 5 percent.

According to the *American National Standard for Safe Use of Lasers*, laser devices that exceed 3R limits may be hazardous and should be subject to more rigorous controls such as training, to prevent injury.²

NIST is a non-regulatory agency with decades of experience providing industry, research and military agencies with laser power measurements traceable to international standards. NIST also has a history of innovation in devices for making such measurements. Technical staff from NIST's Laser Radiometry Project built the laser pointer test bed and collaborated with the NIST Office of Safety, Health and Environment on the tests. NIST has provided its data on laser pointer power measurements to the Food and Drug Administration, which regulates laser product safety.

Green lasers generate green light from infrared light. Ideally, the device should be designed and manufactured to confine the infrared light within the laser housing. However, according to the new NIST results, more than 75 percent of the devices tested emitted infrared light in excess of the CFR limit.

NIST Laser Safety Officer Joshua Hadler designed the measurement test bed.³ The system consists of a laser power meter and two optical filters to quantify the emissions of different wavelengths of visible and infrared light. The power meter and filters were calibrated at NIST. Lens holders ensure repeatable laser alignment, and an adjustable aperture contains the laser light around the output end of the laser.

“The measurement system is designed so that anyone can build it using off-the-shelf parts for about \$2,000,” Hadler says. “By relying on manufacturers’ traceability to a national measurement institute such as NIST, someone could use this design to accurately measure power from a laser pointer.” ■

References

¹ J. Hadler. Random testing reveals excessive power in commercial laser pointers. Presentation at the International Laser Safety Conference, Orlando, FL, March 20, 2013; J. Hadler, E.L. Tobares and M. Dowell. Random testing reveals excessive power in commercial laser pointers. *Journal of Laser Applications*. (Forthcoming.)

² American National Standard for Safe Use of Lasers (ANSI Z136.1-2007) Section 1.2 and Table 1. Lasers that exceed 3R emissions limits are classified as 3B or 4.

³ J. Hadler and M. Dowell. Accurate, inexpensive testing of laser pointer power for safe operation. *Measurement Science and Technology*. Published online March 7, 2013.

Joshua Hadler is a Laser Safety Officer at the National Institute of Standards and Technology (NIST).



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LASER WORLD OF PHOTONICS 2013 PROVIDES PHOTONIC INDUSTRY WITH UPSWING

From May 13-16, 2013 the LASER World of PHOTONICS was celebrating 40 years of existence. The anniversary event was booked out like never before, closing with a record number of 1,136 exhibitors and represented companies. With almost 27,000 trade visitors from 74 countries, visitor numbers again reached a very high level. The proportion of foreign visitors rose to a record level of 54 percent. Significantly more visitors came from China, Russia and South Korea.

The world's leading trade fair has grown into a significant source of stimulus for the industry. Dr. Reinhard Pfeiffer, Messe München's Managing Director, drew a satisfied conclusion: "The 40th anniversary of the world's leading trade fair has demonstrated that Messe München has firmly established its preeminence as a platform for the global photonics industry. This is also underpinned by the continuing increase in the internationality of the visitors."

Thanks to the many positive meetings, exhibitors were very satisfied with the way the trade fair went. Dr. Wilhelm Kaenders, Chairman of the LASER World of PHOTONICS Advisory Board and Board of Management Member of Toptica Photonics AG, said: "We enjoy the world-leading character, the international show public and the strong congress program. At 40, the LASER World of PHOTONICS exudes a maturity that will benefit the continuing disproportionate growth in photonics." The congress too is considered worldwide to be the industry's top event. Prof. Dr. Peter Loosen, Chairman of the Steering Committee of the World of Photonics Congress and Deputy Director of the Fraunhofer Institute for Laser Technology ILT expressed his

satisfaction: "The congress is one of the most important events in the world in the Photonics field. The combination of trade fair and congress is unique. The congress's Application Panels, held in the trade fair halls, are a good example of the successful intertwining of basic research and application-oriented industrial implementation."

TOP SCORES FROM VISITORS AND EXHIBITORS

The role of the world's leading trade fair as a networking and innovation platform is also borne out by the results of the poll conducted by market research institute TNS Infratest. Almost all visitors, 97 percent, gave the trade fair an overall rating of "excellent to good." For 98 percent of visitors, the LASER World of PHOTONICS is the leading trade fair. 96 percent intended to return, an equal number praised the contributions at the Photonics forums. Most exhibitors (91 percent) gave the trade fair an overall ranking of "excellent to good," 97 percent would like to exhibit at the trade fair again. Anton Gaedtke, Vice President Sales Europe, Qioptiq Photonics GmbH & Co KG, Germany had this to say: "The anniversary event has demonstrated that the LASER World of PHOTONICS deserves the title "leading international trade fair." The trade fair is of very great importance to us because it enables us to present our entire range of services in a fitting manner. The Munich location has proved itself to be ideal for this format of trade fair."

INNOVATION EXTRAVAGANZA IN TERMS OF LIGHT: TRENDS AND FUTURE TOPICS

Photonics is considered to be one of the most important cross-cutting and key technologies of the future. Exhibitors displayed





innovations and solutions from all corners of the Photonics world in the four trade fair halls. Klaus Löffler, Director International Sales of TRUMPF Laser- und Systemtechnik said: "The LASER World of PHOTONICS is very important because in principle it is the exhibition showcase for laser technology. We have 19 objects here on the stand and 13 of these products are world premieres. We use the trade fair here in Munich precisely for this presentation function."

Top trends among the great variety of offerings were additive production, ultrashort pulse lasers, laser applications for electro-mobility, energy technology and automotive engineering, modern solid-state light sources (LED, OLED), Automated Visual Inspection, lasers for analytics and imaging in biophotonics as well as laser applications and optical diagnostics in medicine. A highlight was the strongly visited special exhibition "Digital Photonic Production" in collaboration with the Fraunhofer Institute for Laser Technology ILT. It illustrated the advantages of the additive production process and demonstrated 3D printing in metal. Other visitor favorites: the special exhibition "Photons

in Production" with live demonstrations including laser-based joining of lightweight materials and the "biophotonics research focus area" stand. Absolute crowd pullers were the user forums in the halls under the umbrella of the World of Photonics Congress. Staffed with high-ranking speakers from the Photonics industry, from research or user industries such as the automotive sector or medical technology, for days the latest challenges in the various areas were dealt with using practical examples.

The next LASER World of PHOTONICS will be held June 22-25, 2015, the next World of Photonics Congress from June 21-25, 2015. ■

For more information, visit www.world-of-photonics.net or contact Francesca Novak, fnovak@munich-tradefairs.com, or call +1.646.437.1014.

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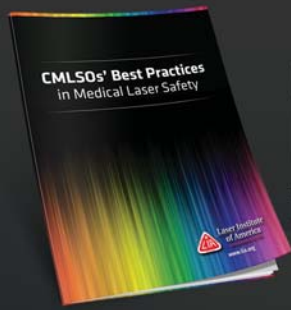


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CORPORATE MEMBER PROFILE

NoIR LASER COMPANY



NoIR Laser Company is a leading manufacturer of laser safety eyewear and custom filters in a variety of markets. Beginning as an off-branch of NoIR Medical Technologies, NoIR Laser Company has since developed over 150 filters for laser and non-coherent light sources in response to customer requests and industry growth. Active in medical, military, aviation, aerospace, scientific and industrial markets, the privately-held company endeavors to serve the unique requirements of any order, no matter the size.



NoIR Medical Technologies was founded in 1973 by Brooks Gleichart, whose family maintains ownership of the company today. Within 20 years, the original NoIR Medical had developed over 50 colors and light transmissions of specialty sunglasses for the visually impaired. NoIR Laser's flagship product line, LaserShields, began with a specific request: "While exhibiting low vision sunglasses at an ophthalmic meeting in the early '90s, a manufacturer of lasers for retinal procedures asked about a filter to absorb their new laser wavelength, since their options for laser safety were expensive and limited," said Director of Marketing David Bothner. "Within a week, NoIR developed that filter, and the LaserShield line was born." Eventually established in 1996, NoIR Laser continues to build upon the strength of its safety eyewear products while responding to the growing needs of its customers.

"NoIR Laser was formed when the second generation left their respective corporate and academic fields, recognizing the opportunity to build the new company and product line from the ground up," said Bothner. Today, NoIR Laser Company is located in South Lyon, MI, and has a total of 35 employees.

NoIR Laser Company offers numerous filters, goggles, windows and other LaserShield products that promote the safe use of

laser-based applications. These products protect users from eye damage caused by radiation, harmful UVs and other laser-based hazards through the use of absorptive dyes and non-reflective technologies. With such a specific focus, NoIR Laser is comfortable in its ability to respond to requests that other companies cannot.

"What makes us different than other laser safety eyewear companies is our ability to design and produce new custom filters quickly. It's not just our ability, but our willingness, our enthusiasm, even, to develop the new filter, even if the initial requirement is small. We recognize that if one user or one company has a new laser line or a new R&D or experimental setup, it's pretty likely that others will follow, and the small need now may very well be a large need in the future," noted Bothner.

NoIR Laser's eager anticipation of technological changes and sudden surges in demand enables them to quickly develop solutions for medical, dental, industrial and scientific markets—segments of the industry that have demonstrated a large need in the company's present.

"By keeping ourselves diversified, we are able to respond to the growth where and when it happens, without being dragged down by those market segments that wane or budgets that get squeezed," said Bothner.

While NoIR Laser sees its innovative capabilities best put to use in absorptive dye technologies, the company strives to find ways to improve the effectiveness and usability of its current products. Recently, mineral glass and reflective technologies have caught the company's attention.

"We are unlikely to stray far from our core competencies, but we're always eager to do more of what we do well," stated Bothner.

As a safety eyewear company that depends on industry standards and efficiencies, NoIR appreciates the ongoing efforts of LIA and the resource it provides to consumers and experts alike.

"NoIR has been a longstanding member of the LIA. The LIA is a very special organization, a critical link between the standards, the safety and laser industries and the users. As an independent organization with a vested interest in the growth of the laser industries, professional training and the 'safeguarding' of the standards, the LIA is a unique and vital resource that we are proud to support," affirmed Bothner.

For more information, visit www.noirlaser.com.

The reaccreditation of **Accredited Standards Committee (ASC) Z136, Safe Use of Lasers** under its recently revised operating procedures was administratively approved effective May 10, 2013 by the ANSI Executive Standards Council. This action, the successful completion of the reaccreditation process, closed the ASC Z136 audit conducted in June 2012.

Revisions to *ASC Z136 Procedures* were made to resolve findings of the audit and were discussed at length during the March annual meeting of the committee. After addressing concerns of committee responsibilities, membership participation and clarification of terminology used and processes imposed, the committee unanimously approved these revisions and the document was submitted to ANSI. Changes to be aware of include:

- ASC Z136 is the **committee**, as a whole.
- The **“consensus body balloting group (CBBG)”** is the balloting group established at the time of balloting on a new or revised standard.
- An **appeals panel** will be selected by the Secretariat when required to address an appeal, rather than selecting an appeals pool annually.
- Voting on approval of **“proposed draft documents”** includes

new, revised, reaffirmed or withdrawal of a current standard.

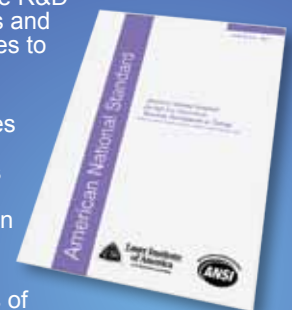
- Membership **“non-participation”** has been defined as failure to respond to committee balloting requests and failure to attend the annual meeting (either in person or by proxy).
- Member **Interest Categories** are listed in the procedures and defined in ASC Z136 Conventions (www.z136.org).
- Subcommittee membership has been relaxed to **“should conform to a reasonable standard of balance among the various interests represented on the subcommittee...”**
- Clarification that “All CBBG members will have the opportunity to respond to [an ongoing] recirculation ballot, **including cases where they did not cast an earlier vote or abstained.**”
- Specific to balloting on a proposed draft document, “In the instance of non-substantive changes that address a negative ballot, **the objector will be given the opportunity to withdraw the negative ballot** prior to recirculation...”
- ASC Z136 will now adhere to the current versions of ANSI’s **Patent Policy** and **Commercial Terms and Conditions Policy** as specified in the ANSI Essential Requirements.

For a copy of *ASC Z136 Procedures for the Development of Z136 American National Standards*, please visit www.z136.org or contact Barbara Sams at +1.407.380.1553 or bsams@lia.org.

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THE VALUE OF CERTIFICATION

Keeping pace with the tremendous growth of lasers in popularity and applications is the demand for properly trained laser safety professionals. The need for businesses and organizations to clearly identify individuals with the expertise to manage advanced laser safety issues arises from the complexity of the hazards associated with numerous laser systems combined with the unique skill-set required to evaluate and implement appropriate control measures.

For professionals working around lasers, becoming certified by the Board of Laser Safety (BLS®) is one of the highest credentials a laser safety officer (LSO) can acquire. BLS certification demonstrates that individuals in the laser safety field have agreed to adhere to higher standards of safety and professional practice. The BLS offers two certifications: the Certified Laser Safety Officer (CLSO®) and the Certified Medical Laser Safety Officer (CMLSO®).

Becoming certified gives an LSO a competitive advantage. "BLS certification demonstrates to the public, colleagues and employers one's qualifications and proficiencies," states Barbara Sams, Executive Director, Board of Laser Safety. "It identifies the individual as an LSO who has achieved a specific level of knowledge and expertise, and possesses a higher level

of commitment to the industry. It enhances the LSO's credibility as the authoritative individual responsible for the facility's laser safety program."

For the employer, having a CLSO or CMLSO on staff demonstrates due-diligence and helps to ensure legitimacy and adequacy of the laser safety program, validating the company's dedication to a safe working environment for all employees.

MARK YOUR CALENDAR

On July 9, BLS Board Commissioner Don Haes will be presenting a talk on the BLS' certified laser safety officer program at the 58th Annual Meeting of the Health Physics Society (Madison, WI). Special sessions on non-ionizing radiation will be held throughout the day, with laser-related talks in the afternoon. David Sliney will present **Optical Radiation Safety**, while Ken Barat will be giving two papers, **Review of DOE Accidents** followed by **Laser Safety in R&D Facilities**. Both CLSOs are part of the inaugural group to have earned certification in 2002, and continue to maintain that certification status today.

SUMMER SALE

All BLS apparel is on sale at 20 percent off while quantities last! Call the BLS at +1.407.985.3810 to request your size and place your order.

Certification for Laser Safety Officers

Providing Professionals a Means for Improvement in the Practice of Laser Safety



Gain a Competitive Advantage by Becoming Certified Today!

- Elevate your status as an LSO
- Stay up-to-date with industry changes
- Increase both confidence and credibility
- Demonstrate your commitment to the job
- Validate your employer's dedication to a safe working environment



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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. View complete articles of the abstracts below online under the Featured Category.

FEATURED ABSTRACTS

LASER POINTER PROHIBITION – IMPROVING SAFETY OR DRIVING MISCLASSIFICATION?

By Trevor Wheatley

It is well known that since 2008 Australia has had some of the world's most restrictive laws regarding the possession and importation of "laser pointers" with powers exceeding 1 mW. Following the purchase of a laser pointer that was misrepresented as legal in Australia, the question as to whether this strict legislation has actually improved safety concerning laser pointers is addressed. The legislation has been in effect for four years now, so one would expect that the ripples of change will have settled sufficiently that comparisons of pre and post implementation can be made.

LIFE AND BREATH: UPPER AIRWAY GUIDELINES

By Vangie Dennis

The 2010 EPRI Institute estimated the number of operating room fires occurring annually in the United States are 550-650 which includes about 115-135 airway fires. Airway fires continue to

be the most prevalent cause of operating room fire-induced serious injuries and death. The surgical team should understand ignition sources, fuels and oxidizers present during head and neck surgery and employ the preventative measures to decrease the potential for this type of surgical fire. This presentation will review legal cases of airway fires with the primary objective and focus on prevention.

TEMPORARY VISUAL IMPAIRMENT FROM LEDS IN TOYS

By Michael Higlett, Marina Khazova, John O'Hagan

The continuing development of LED technology has resulted in the ever increasing use of LEDs in a wide range of consumer products, including toys. LEDs are used to a greater extent by toy manufacturers today to enhance toys visual appeal and choosing the appropriate LED is important to avoid the risk of harm to the child. The significant increase of optical output and expansion of the emission wavelength range, from ultraviolet to infrared, raised a concern about optical radiation safety of LED use in toys.

ANSI Z136.3

2011 SAFE USE OF LASERS IN HEALTH CARE



REVISED DOCUMENT ADDRESSES:

- New Wavelengths
- Audit Requirements & Procedures
- Management Model for Diverse Use
- Safety Concepts/Personnel Responsibilities
- Lasers for Home Use
- LSO's Role in Rental Services
- Sample Forms

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PUBLISHED BY
**Laser Institute
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Laser Applications and Safety

JLA UPDATE

The Laser Institute of America's official refereed publication, the *Journal of Laser Applications*[®] (*JLA*), an online-only journal, is complete with new features for a broader audience. *JLA* is hosted on AIP Publishing's robust Scitation online platform, providing the journal with great functionality and the ability to leverage a wide range of valuable discoverability features. *JLA* features nine topic sections, a faster peer-review process and a more functional website (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 in more useful ways.

RESEARCH HIGHLIGHT

LASER-ASSISTED PLASMA ARC WELDING OF STAINLESS STEEL

By Achim Mahrle, Sascha Rose, Michael Schnick, Eckhard Beyer, Uwe Füssel

A plasma arc and a low-power/high beam quality laser beam were coaxially combined into one process in order to obtain a more efficient and stable arc for thin sheet welding applications. Theoretical discussion of interaction mechanisms between the laser beam and the plasma arc and results of bead-on-plate welding trials carried out on AISI 304 stainless steel will be presented. Measurements were made of electrical and geometrical arc properties with and without assistance from the laser beam. Additionally, the impact of the laser beam on the weld seam geometry was evaluated. The results showed that the use of the additional low-power laser beam is capable of producing significant process improvements in comparison to the individual plasma arc process alone with respect to arc stability and welding performance.

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MEMBER INNOVATIONS

ECONOMICAL, CLEAN, ENVIRONMENT-FRIENDLY – LASER WIRE BUILDUP WELDING

For the very first time the Fraunhofer-Institut für Werkstoff- und Strahltechnik (IWS) Dresden presented its novel coaxial laser wire deposition head COAXwire for high precision metal deposition procedures at the tradeshow LASER World of PHOTONICS 2013 in Munich. This novel approach is most suitable for the generation and repair of components as well as for the functionalization of surfaces. In a form-giving laser buildup welding process the use of wire instead of powder imparts a number of decisive advantages. For example, independent from the part geometry the material utilization is always 100 percent. It is a very clean process and there is only a minimal need for finishing steps. Due to the fact that the specific surface of wire is much smaller than that of powder, there is only a small risk that wires will chemically react with the surrounding atmosphere. This property allows very advantageous processing options for reaction-sensitive materials such as titanium or aluminum. For more information, visit www.iws.fraunhofer.de.

INNOVATIVE TOMOGRAPHIC IMAGING PROCESS

Scanning Laser Optical Tomography (SLOT) is a fast method which can be used for imaging biological tissue or complete organs in a high 3D resolution. The Laser Zentrum Hannover e.V. (LZH) has filed a patent application for a SLOT process, which was originally developed as a 3D fluorescence process for quickly scanning larger samples. SLOT, which can be viewed as the optical equivalent to computer tomography, works with isotropic resolution, that is, with the same resolution in all three spatial planes. It simultaneously records transmissive, scattered and fluorescent light. Samples can thus be imaged with a 3D resolution of at least 1/1000 of the object size, in a short time. The goal of the current project is further development of this promising technology, so that an imaging speed of 20 seconds for 600 individual projections can be reached. For more information, visit www.lzh.de.

ROFIN LAUNCHES THE NEXT GENERATION OF FIBER LASERS ONTO THE MARKET

ROFIN FL Series of fiber lasers have already firmly established themselves within the industrial production sector and are synonymous with efficiency, precision and cost-effectiveness in a large number of applications. With a new generation of fiber lasers, the ROFIN Macro Group is now enhancing its position as a quality supplier of high-performance fiber lasers. ROFIN presented the FL 020, the first model from this series. Smaller, more compact and easier to use best describes the new performance and design enhancements. The 2 kW fiber laser, that can be equipped with up to 4 fiber outputs, comes in a smaller, wall-mountable housing, with simultaneously improved fiber handling and with reduced water requirement. For more information, visit www.rofin.com.

MEMBERS IN MOTION

ABB ROBOT FEATURED IN IRON MAN 3

ABB's multipurpose industrial robot the IRB 120 makes a cameo appearance somewhere at the end of the new Iron Man film. Iron Man 3 is not the first time that an ABB robot has appeared in a major motion picture or even been used by the entertainment industry. ABB's robots have been featured in the sci-fi action thriller Terminator Salvation, appeared in a Chemical Brothers' music video and even gone on tour with Bon Jovi.

When it isn't preparing for a walk down the red carpet, the IRB 120, which weighs in at a slender 25 kg, is the smallest multipurpose industrial robot ever designed. Its six-axes can handle a payload of up to 3kg (4kg with its wrist down) and with a reach of 580 mm, it is able to carry out a series of operations using flexible, rather than hard, automated solutions. For more information, visit www.abb.com.

IPG PHOTONICS ACQUIRES MOBIUS PHOTONICS TO ACCELERATE UV LASER DEVELOPMENT

IPG Photonics Corporation (NASDAQ: IPGP) announced the acquisition of privately held Mountain View, California-based Mobius Photonics to accelerate its entry into the UV laser market and deepen IPG's development team. Mobius provides high-power pulsed UV fiber lasers for micromachining, such as dicing and scribing of wafers and VIA drilling and solar hybrid panel processing. For more information, visit www.ipgphotonics.com.



WELCOME NEW CORPORATE MEMBERS

Alphatronics, Inc.
Arlington, TX

BOS PHOTONICS
North Andover, MA

Center for Physical Science and Technology
Vilnius, Lithuania

DeluXLaser (Shanghai) Co., Ltd.
Shanghai, China

Minus 10 Aesthetic Spa, LLC
Marblehead, MA

For a complete list of corporate members,
visit our corporate directory at www.lia.org/membership.

LIA ANNOUNCES

LIA TRAVELS TO DC TO PROMOTE ITS MISSION

Jeannette Gabay, long time LIA staff member, won a scholarship to participate in the ASAE Annual American Association Day – Capitol Hill Day, which took place in Washington, DC on March 18-19. The Association Fly-In Day included lobbying our elected officials on behalf of LIA's tax exempt status, government employees' attendance at LIA's courses and conferences and Advanced Manufacturing. On March 19, Gabay met with staff members of the following elected Florida officials: Senator Bill Nelson, Senator Marco Rubio, Congressman Gus Bilirakis, Congressman John Mica, Congresswoman Frederica Wilson and Congressman Dennis Ross.



In her meetings, Gabay petitioned to vote against any tax reform activity that could potentially jeopardize LIA's current tax exempt status. She highlighted LIA's mission statement to promote laser safety and applications and that the services LIA is able to provide, with our current tax exemption, "promote advances in product development and manufacturing in the United States."

In addition, Gabay defended her second point to vote against Senate Amendment 67 to the Continuing Resolution, HR 933 that prevents or limits government employees from attending conferences sponsored by professional, scientific and educational societies. Gabay went on to say that the conferences and courses that LIA hosts present the latest information and discoveries in the laser industry and are a vital resource to government employees. Not to mention, the face-to-face networking opportunities that they provide with the world's leading experts in the field.

Gabay's last appeal was for officials to vote in favor of any bill or budget items that support funding for Advanced Manufacturing, including workforce and veterans training. "For decades, the US led the world in innovations using lasers. Continued innovation is critical to ensuring our leadership position in laser advanced manufacturing and growing our economy," she argued. With increased funding, LIA's mission is to do just that – foster lasers, laser applications and laser safety, worldwide.

NEW! SPRING 2013 PUBLICATIONS CATALOG



This Spring, LIA released its newest *Laser Safety & Applications Resource Catalog* featuring the latest publications and training that the industry has to offer! Nothing is more powerful than knowledge, and with publications from the Laser Institute of America, you're getting 45 years worth of know-how from the leading professionals in laser technology. From national safety

standards to instructional how-to guides on laser applications, these items are necessities for laser users in all environments. Make sure that you do not miss out on the newest laser training, publications and sales that are only available for a limited time. To download a copy of the new Spring 2013 catalog, visit www.lia.org/store.

REGISTER NOW FOR LME 2013!

Registration is now open to attend LIA's third annual Lasers for Manufacturing Event (LME®) which will be held September 11-12, 2013 in Schaumburg, IL. LME 2013 will provide a one stop event for companies interested in integrating laser technology into their production. Visit the show floor theater for keynote presentations on the overall impact of lasers in general manufacturing, plastics manufacturing and the laser requirements for aerospace and automotive manufacturing. Attend the expanded free educational sessions covering not only the main laser types, laser systems, ROI and safety, but courses on the fundamentals of laser cutting, laser robotics and laser additive manufacturing. Learn from world famous authorities, understand how laser technology is the future of manufacturing and how it is applied, and connect with the suppliers who can help you to benefit from using lasers in your manufacturing. For more information on registering to attend, exhibiting at or sponsoring LME 2013, visit www.laserevent.org or call 1.800.34.LASER.

ICALEO 2013 – REGISTRATION OPEN!

Come and be part of LIA's 32nd International Congress on Applications of Lasers & Electro-Optics (ICALEO®) October 6-10, 2013 in Miami, FL. ICALEO is where researchers and end-users meet to review the state-of-the art in laser materials processing and predict where the future will lead. ICALEO has always been devoted to the field of laser materials processing and is viewed as the premier source of technical information in the field. Topics will include laser process monitoring and control, laser processing of biological materials, laser hybrid processing, laser manufacturing for alternative energy sources and laser business development. For more information on registering for ICALEO, or for sponsorship and vendor opportunities, visit www.icaleo.org or call 1.800.34.LASER.



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TRUMPF Lasers Experience, Innovation, Versatility

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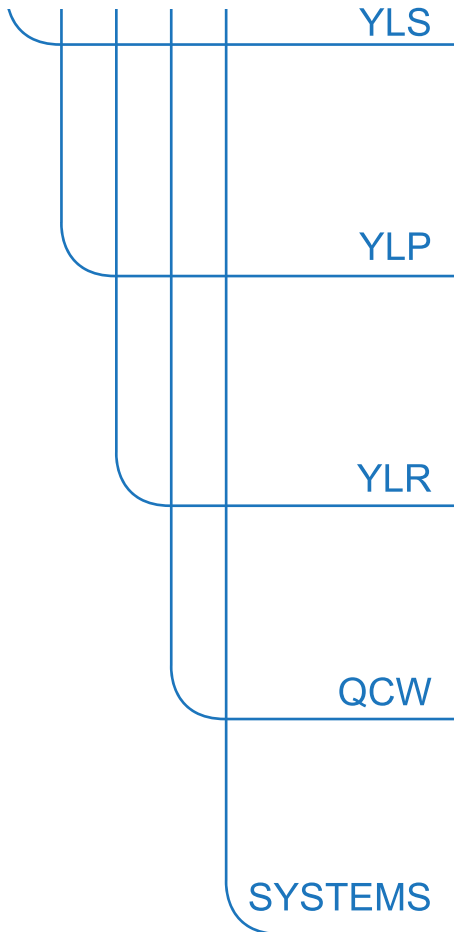
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- Multi mode or Single mode
- High Electrical Efficiency
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Q-SWITCHED (PULSED) FIBER LASERS
The Market Leader for Metal Marking Applications.

- Over 25 Models at 1070 nanometers, 8 models at 532 nanometers
- Pulse Energy > 50 milli joules
- Peak Power to 1 megawatt
- Pulse Duration from 70 picoseconds - 400 nanoseconds
- Air and Water Cooled Units
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- Rack mount or OEM Module Designs

RACKMOUNT CW FIBER LASERS
Ideally Suited for Medical Device Manufacturers, Research Labs, and Precise Cutting and Welding Applications.

- Models available from 20 to 1,000 Watts at 1070 nm, 10 to 100 Watts at 532 nm
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- Air-Cooled to 500 Watts
- Modulation to 50 kilohertz
- Touchscreen, Digital, Analog, and RS-232 Standard Interface
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- Single Mode to 1.5 kW
- Internal Pulse Generator
- Full Industrial Interface

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- Available with Auto-feed
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- Optimized for Maximum Throughput
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