LIA TODAY

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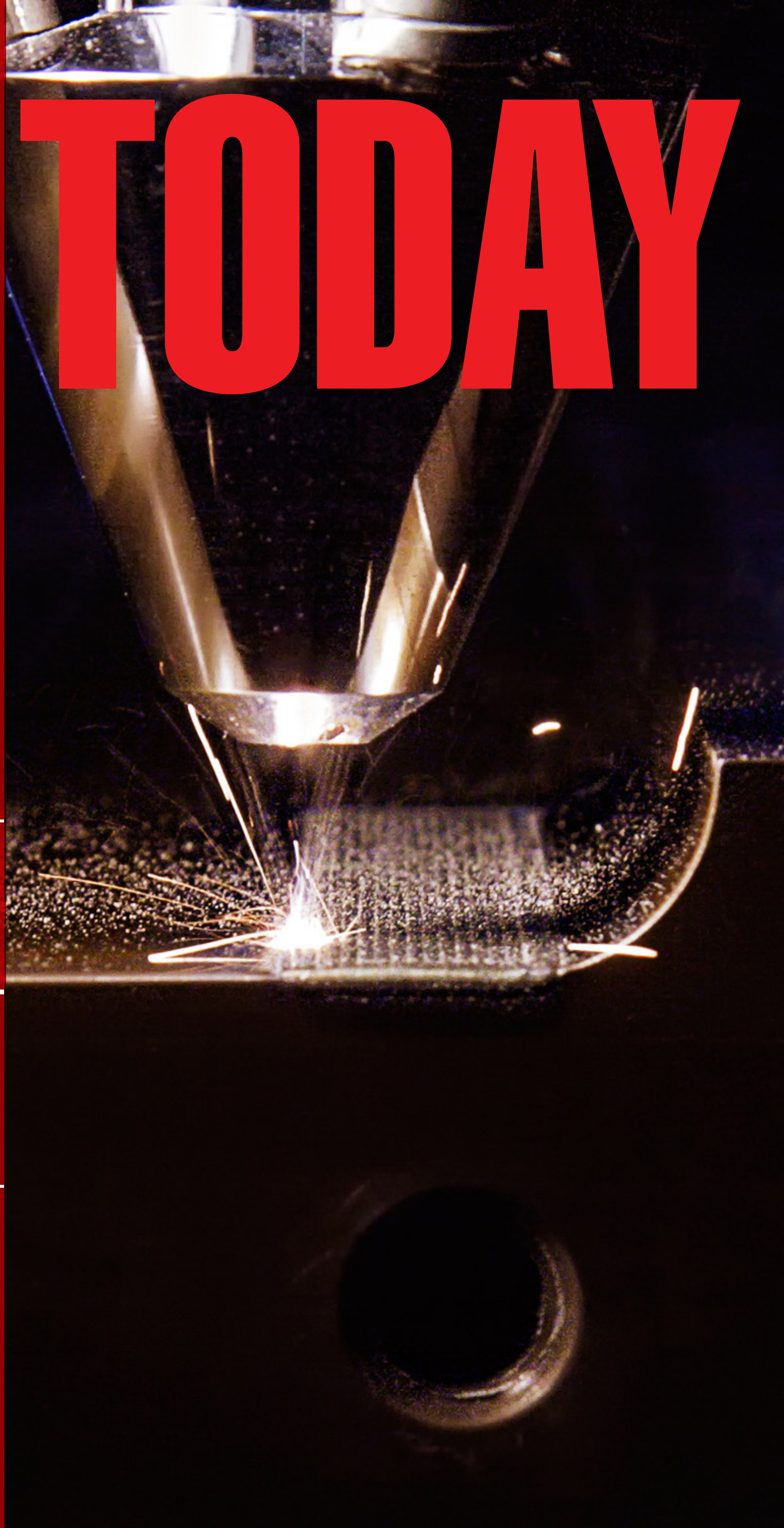

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LIA TODAY

THE OFFICIAL NEWSLETTER OF LIA

LIA TODAY is published bimonthly to educate and inform students and professionals of challenges and innovations in the field of photonic materials processing.

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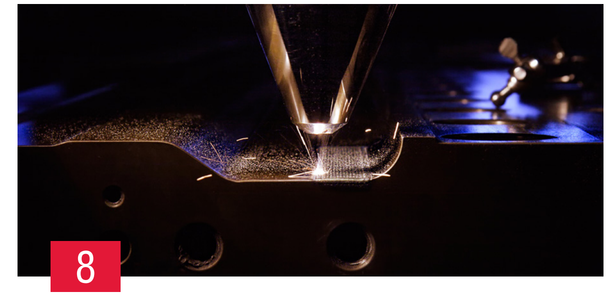

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AUTOMATED TOOLPATHS WITH INTEGRATED PROCESS PARAMETERS FOR OPTIMAL LASER CLADDING TECHNOLOGY

By Igor Ortiz, M. Angeles Montealegre, Piera Álvarez

Laser cladding is a new complex manufacturing process, due to many variables that are involved. For coating or hardening complex 3D geometries, a customized CAM-system is needed for calculating the laser process toolpaths necessary for filling the complete treated area.

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BLS: INTRODUCING THE EXTENSION YEAR

The Board of Laser Safety recently announced that they are introducing the option of an extension year to CLSOs and CMLSOs who have not been able to meet their Certification Maintenance requirement by the deadline. Find out more about it in this article.

FEATURES

BLS NEWSLETTER

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LIA Laser Safety Trainings

LASER SAFETY OFFICER TRAINING	
Orlando, FL	Jan. 22 - 24, 2020
Orlando, FL	May 27 - 29, 2020
Orlando, FL	Aug. 19 - 21, 2020
Orlando, FL	Dec. 2 - 4, 2020

LASER SAFETY OFFICER WITH HAZARD ANALYSIS	
Orlando, FL	Jan. 27 - 31, 2020
Orlando, FL	Jun. 1 - 5, 2020
Orlando, FL	Aug. 24 - 28, 2020
Orlando, FL	Dec. 7 - 11, 2020

MEDICAL LASER SAFETY OFFICER TRAINING	
Orlando, FL	Jan. 25 - 26, 2020
Orlando, FL	May 30 - 31, 2020
Orlando, FL	Aug. 22 - 23, 2020
Orlando, FL	Dec. 5 - 6, 2020

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

Course Highlight

INDUSTRIAL LASER SAFETY TRAINING ONLINE - ANYWHERE, ANYTIME

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, LIA's Industrial Laser Safety Course provides the specialized training you need for laser materials processing.

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.

Based on the ANSI Z136.1 Safe Use of Lasers standard, this online course is packed with helpful, easy-to-understand information about the basic safety concerns in laser materials processing. .

ONLINE

PRESIDENT'S MESSAGE

Gilbert Haas
LIA President 2020

Working through these challenging COVID times in the United States, some states are opening up while others are now seeing record daily cases emerge. While Florida is seeing the latter, the LIA staff continues to work safe remotely.

The annual LIA Executive Committee meeting, held remotely for the first time, was very successful. Given the COVID environment, remote meetings that we all dreamed of achieving in the future were fast-tracked to the present and will now serve as a viable platform for future national and international communications. In addition, the change over to a virtual ICALEO 2020 will set the stage moving forward toward future ICALEO's. The "collateral beauty" is that we will now have these tools to enhance all future communication and events.

In the near future you will begin to notice the efforts and hard work the LIA staff has been doing during these times. Membership benefits will be enhanced while the LIA continues to evolve into a very unique organization. We appreciate your support and guidance along this journey.

Be well and stay safe,
Gilbert J. Haas

EXECUTIVE DIRECTOR'S MESSAGE

Nat Quick
Executive Director

What a year of challenges! There were many to overcome, however, there is also a lot of good to reflect on. A recent success is that we did seize the opportunity to finally decrease our office rent by relocating to a different office suite building in the University of Central Florida (UCF) Research Park. This new office provides reduced but adequate space and complements our needs for staff working mostly from home offices.

Earlier this year we began to explore the availability of properties more suited to our needs. We were approached by a company through our broker that required space equivalent to our then office suite. The only issue was the requirement that they needed to take possession by the end of December 2020. This was a short period of time to work with, especially as this interest in our property occurred, of course, during preparation for and execution of ICALEO 2020. The Department Directors were pressed into service to undertake the task of finding and selecting new property for LIA within a limited time period. We were close to making a final decision when a new opportunity arose with the current landlord regarding an office suite that was available in a neighboring office building located in the UCF Research Park. This location was a good fit for LIA and so on December 17, 2020 we took possession of our new office suite location:

LIA
12001 Research Parkway
Suite 210
Orlando, FL 32826

I deeply thank the Department Directors for successfully completing this high-pressure relocation task so soon after the completion of our first and successful virtual ICALEO. I would also thank President Gil Haas for reviewing and providing advice on lease agreements. This was an important task and we would like to thank him for all his services this year.

We wish you and your family a Happy Holidays. With your support of and contributions to LIA programs we are very optimistic about 2021. We also look forward to "catching up" with you and all our colleagues and members at "person-to-person" events such as ILSC and ICALEO 2021.

Stay safe and keep others safe

TRENDING IN THE NEWS:
LIA'S TOP 4 ARTICLE PICKS

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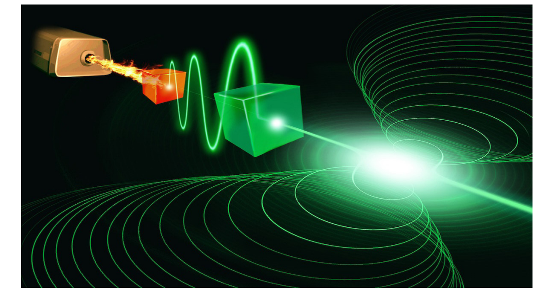
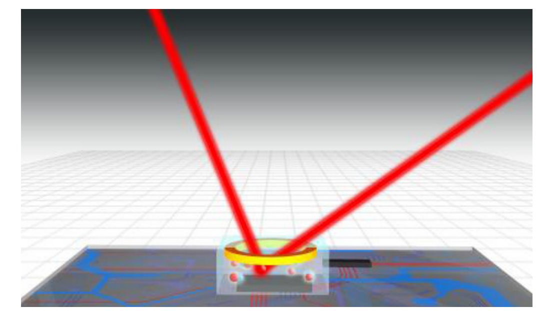


PUSHING THE LASER LIMIT

Australian quantum researchers have shown it's possible to vastly improve the coherence of lasers, overcoming a bound that has been accepted as a fundamental limit for 60 years.

Read more

2



FRAUNHOFER RESEARCHERS USE QUANTUM PHOTONICS FOR TAP-PROOF COMMUNICATIONS

Researchers at Fraunhofer IZM are developing a universal platform that enables solutions for tap-proof quantum communication and high-precision quantum sensors to be miniaturized, quickly and built to customer specifications.

Read more

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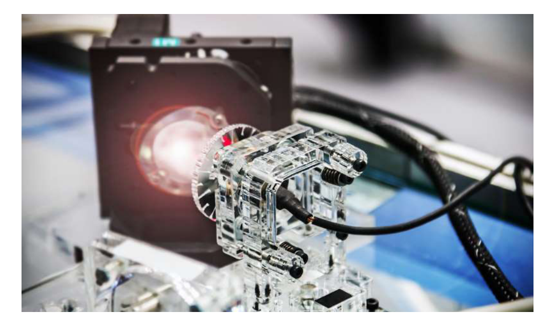

LASER-BASED HACKING FROM AFAR GOES BEYOND AMAZON ALEXA

The team that hacked Amazon Echo and other smart speakers using a laser pointer continue to investigate why MEMS microphones respond to sound.

Read more

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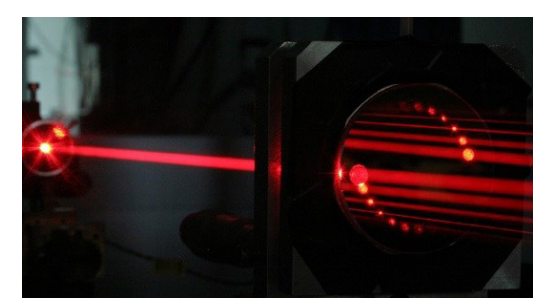

MULTIPASS SPECTROSCOPY METHOD ENABLES DISEASE-DETECTING BREATH TEST

An optical sensing method developed by a research team at the University of Warsaw relies on highly sensitive spectroscopic measurements to detect the presence or absence of formaldehyde in a person's breath.

Read more

Automated toolpaths with integrated process parameters for optimal laser cladding technology

Authors:
Igor Ortiz, M. Angeles Montealegre, Piera Álvarez

Laser cladding is a new complex manufacturing process, due to many variables that are involved. For coating or hardening complex 3D geometries, a customized CAM-system is needed for calculating the laser process toolpaths necessary for filling the complete treated area.

Talens System has developed a new CAM-Software AZALA, that has been designed for automating the toolpaths and process parameters researched and validated in our laboratory machine tool. AZALA software automates the process workflow and creates a friendly user interface, for generating automated laser process toolpaths that the process know-how is integrated in them for a complete workflow automation. Futhermore, with AZALA software, the user is able to work in both environments: laser cladding and hardening processes.

Additive manufacturing started in the eighties as a new technology for surface coating and repair added value parts. This technology includes three main processes: coatings, part repair, and build near net shape 3D geometries. Laser cladding is a coating technology that can include into the additive manufacturing process. In this process, a metallic powder or wire is melted on metallic substrate using high power laser as a heating source. The result is a metallurgical bonding between both.

Laser cladding is a new complex manufacturing process due to many variables that are involved. These variables include laser process power, process speed, powder feeding rate, gas flow, laser on and off connections etc. In addition, variables intrinsic to the geometry of the laser clad such as the width or height of the laser track and the dilution with the substrate or the overlapped between contiguous tracks must be taken into account. During the coating process, unless a special nozzle is available, it is required to keep the laser head with the nozzle perpendicular to the part of the surface in order to maintain the cone of the powder flow stable during the process. The programming complexity rises, controlling the robot axes with the correct nozzle head orientation. The nozzle head is assembled in the robot arm and must maintain a normal orientation with the surface. This orientation is supplied with a coordinate and vector position that is attached on each point.

Due to different industry sectors like turbine blades, mold and dye, oil and gas, energy, automotive, and aerospace, etc. there are different types of parts and geometries that can be susceptible for repair by laser cladding. For coating complex 3D geometries, a customized LMD-CAM system is needed for calculating the laser cladding toolpaths necessary for coating.

There are barriers with software that arise in complex programming tasks and in many manual interactions due to modifications from machining processes to laser cladding processes. There could be incomplete and fragmented software due to the toolpaths algorithms that are prepared for machining processes; one could need to request expert knowledge due to new process variables; or there could be lack of standards for process integration with the software environment.

Talens System has developed a new CAM-Software- AZALA, able to overcome these barriers and calculate these complex tool paths. Based on “in deeply” experimental research that has been integrated with mathematical algorithms for achieving automated toolpaths with validated laser process parameters inside.

This software has been designed for automating the toolpaths and process parameters and has been researched and validated in our laboratory machine tool. Process know-how and variables have been programmed in customized CAM environment for laser cladding processes like coating, repair, and building geometry from 3D CAD data. With this software, the operator is able to create automated slices and configure a toolpath including the process parameters inside on each slice.

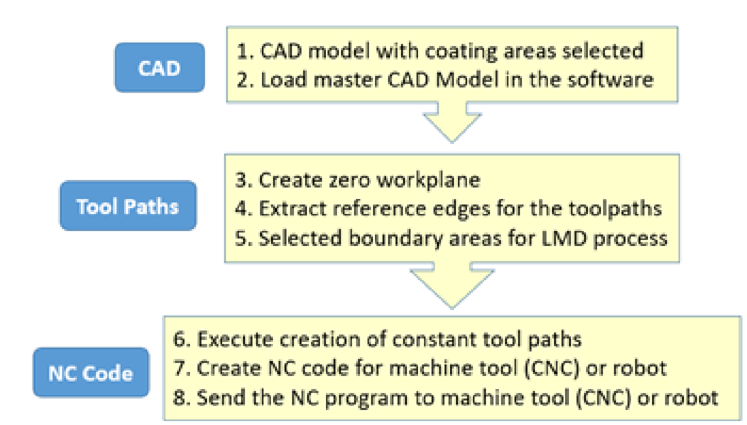

Figure 1: Software Work flow

The software development started with process variables like overlap between contiguous laser tracks, layer height, laser power, process speed, powder feeder activation, and laser on and off connections. With the description of these variables a mathematical approach of a coating toolpath was developed. These toolpaths have been validated with equidistant distances between each track in the laser cladding process. The software is capable, in a simple way, to calculate the toolpaths for 2D and 3D CAD surfaces and geometries. Data points have been added to the laser cladding toolpath, these data points are linked to CAD geometries for optimizing the cladding process with the part geometry. On each toolpath the points have assigned the process variables for automating the laser cladding process and reduce manual intervention.

The software has been designed to solve the complex variables related to laser additive manufacturing and laser hardening processes. The workflow is divided in three main steps, the first step is when the user selects, by colour, the areas to be coated or hardened in any CAD system. After this selection the CAD model is loaded in the system. (Figure 1)

When the part model is in the software it must be configured for the laser coating/hardening process. The desired work plane is created for future post-processing the NC code for CNC or robot cells. The next step is to extract the geometry edges for creating the toolpaths with equidistant track toolpaths for a correct coating of the piece (Figure 2). After the edge extraction, the areas that were previously prepared by colour and need to be coated can be selected automatically. If necessary, the manual area selection is also configured.

When the user has both types of data designated, extracted edges and selected surfaces, the next step is to calculate the toolpaths. The process parameters are already preconfigured in the software, so there is no need of configuring again. After the toolpath's calculation, the user just has to export the toolpath to NC code format. Finally, the NC program can be loaded in machine tools or robot cells.

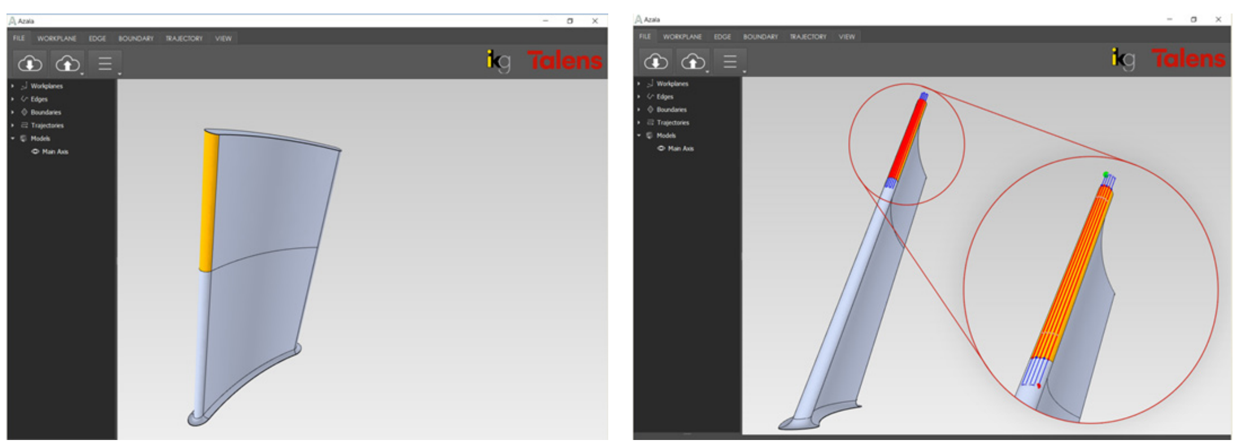

Figure 2: Software user interface

With this software, we are capable of using different types of toolpaths. For example, with the first type of toolpath, geometry edges can be extracted and equidistant toolpaths that are suitable for some cases can be created. The second type of toolpath creates an adaptive toolpath with the surface geometries. This toolpath is adaptable along the surface type changes.

The software has a user-friendly interface for managing the laser cladding toolpaths that can be calculated, with preconfigured buttons in the software. Both types of toolpaths have a mathematical algorithm for generating equidistant tracks for a suitable coating of the surface and to guarantee good adherence between the melted powders with the substrate. The laser on and off connections, process speed, and power variables are inside the toolpaths. On the other hand, the process variables are validated and configured inside the toolpath. With this capability the toolpaths are fully automatic, and a friendlier workflow is created to avoid human errors. With this option, the laser process is fully automatic so a process engineer or a senior operator can manage it.

As a conclusion:

- New AZALA software automates the process workflow and creates a friendly user interface, for generating automated laser process toolpaths, which integrates the process know-how for a complete workflow automation.
- The user is able to work more efficiently in both environments: laser cladding and hardening processes.

About Talens Systems, Inzu Group, www.talenssys.com

Talens Systems is a technology based innovative enterprise committed to the development and commercialization of turnkey solutions for laser applications and presenting its disruptive technology in development for laser heat treatment, laser cladding and laser cutting processes.

About the Author

Igor Ortiz is a R&D project manager and researcher in Ikergune at Inzu Group. He has a Master of Science (MSc) in industrial engineering from Ecole d'ingénieurs du CESI. He has more than 10 years of experience in product development, FEA tools, and production plants, and has been involved in different projects in the automotive and aerospace industries. Currently, he leads automated software development tools for laser material process (additive manufacturing, hardening).

WANT TO SHARE YOUR IDEAS WITH THE LASER COMMUNITY THROUGH *LIA TODAY*?

LIA TODAY

Check out the guest article guidelines below and get in touch with an editor today!

BEFORE YOU SUBMIT:

Content: We are always looking for great newsworthy content that covers challenges and innovations in the field of photonic materials processing, laser safety, and laser market trends. This is not a paid opportunity, but does carry the benefit of publishing your work on a platform that is read by thousands of your peers. All article topics should be confirmed with an LIA TODAY editor before writing your article. Please email your article ideas to liatoday@lia.org and an editor will be in touch with you.

Potential Categories: Safety, medical applications, research and development, laser applications fundamentals, history, business, and other categories.

Potential Industries: Energy storage, aerospace, DoD non-aerospace, automotive, medical devices and biotechnology, microelectronics and IC fabrication, Internet of Things, research and development, and other industries.

SUBMISSION GUIDELINES:

Style: The tone should be editorial and informative; it should not sound like a sales pitch. It should be comprehensible by a broad audience of readers with low to expert experience with the topic, so it is important to include examples and simple explanations alongside any technical language.

Length: 600 - 1500 words

Text: Please use standard fonts such as Arial, Calibri, or Times New Roman. Fonts, font sizes, and line spacing will be reformatted by LIA for the final piece. Grammar and mechanics will be edited to the LIA style guide by LIA, but please be mindful of spelling and grammar as you are writing so that your message is clear.

Headline: Please include two newsworthy headlines suggestions for your article using action verbs.

Images & Figures: Please include images to be used with the article. Submit as an email attachment (PNG, GIF, JPG, JPEG) (min. 1000px in width or height). Images should also be placed in the body of the text where the author would like them to appear in the final article. All figures or images should include captions.

Deadlines: All material is due no later than two weeks prior to the scheduled publishing date. Check with an editor for your deadline.

Note: LIA reserves the right to abstain from publishing a submitted article for any reason.

SUBMISSION CHECK LIST:

- Full text as a Word Document
  - Abstract: A 50 – 100 word summary in plain language
  - Two (2) headline suggestions using an action verb
  - Article 600 – 1500 Words
  - Images with captions placed in the body of the article
  - Article references when applicable
  - Short author *bio* (full title, company, 50 words)
  - (optional) Professional headshot of author
- Images attached in one of the accepted file types (.png, .tiff, .jpeg, .jpg) (min. 1000px width or height).

VIEW SUBMISSION FORM

THE BOARD OF LASER SAFETY

NEWSLETTER

Volume 1 • Issue 5

Recently Certified

Mei Kwan April Chow - CLSO

Michael Benson - CMLSO

Tiffany Lucas - CMLSO

Jason Rountree - CMLSO

Nicholas Harmon - CLSO

Eric Soltycki - CMLSO

Simon Murphy - CMLSO

Davin Gaskin - CLSO

Certification Renewal Deadline

The certification renewal deadline is December 31, 2020. Please be sure to have all forms and applicable payments submitted/postmarked by that date. For updates on renewal policies, please review the certification maintenance tab on our website or view the quick guide on certification maintenance found here: https://youtu.be/iBm4Xgqgm24

Extension Year

We have an exciting update! This year we are introducing the Extension Year. If you are applying for an extension visit this link for forms: https://www.lasersafety.org/certification-maintenance/renewal

More information on the extension year can be found on our website or in this issue's article.

BLS Articles Now Available on LaserChirp

All articles from the BLS Newsletter that were written by CLSOs and CMLSOs this past year can now be found on the LaserChirp! Catch up on the latest laser safety tips and tricks by fellow CLSO and CMLSOs, all in one place.

Find them here: https://www.laserchirp.com/category/bls-newsletter/

ANSI Z136.7 (2020) Testing and Labeling of Laser Protective Equipment

Z136.7-2020 hardcopy version is a single-user softbound version that provides reasonable and adequate guidance for consumers and manufacturers of laser protective equipment.

This standard is intended for anyone selecting or testing laser protective materials. The ANSI Z136.7-2020 standard provides recommendations for testing and labeling laser protective materials and protective equipment such as eye protection, barriers, and windows designed for use with lasers and laser systems that operate at wavelengths between 180 nm and 106 nm. All appendices are informative.

Write for BLS!

Looking for a way to earn BLS CM points for free? BLS has restarted it's newsletter and is inviting CLSOs and CMLSOs to share laser safety knowledge with the laser community! Published article submissions are worth 0.5 BLS Certification Maintenance (CM) points in Category 3. For more information on guidelines and regulations, email us at bls@lasersafety.org. Check out one of our submissions on the next page!

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Telephone: +1.407.985.3810
Email: bls@lasersafety.org
Website: www.lasersafety.org

BLS Introduces the Extension Year

After an individual has passed the certification examination, he/she will be required to maintain that certification through approved professional development activities over the 3-year certification period. As the industry changes and technology grows, so too must the knowledge of the CLSO and CMLSO. The BLS only recognizes BLS Certification Maintenance (CM) points and may award these points for eligible laser-related activities.

This year, the Board of Laser Safety has introduced the option of the Extension Year. If you are a CLSO or CMLSO and you were unable to finish earning the 10 Certification Maintenance points that are required in the 3-year maintenance cycle, there is now a new option for you. The extension year option gives you an additional year after your December 31 deadline to earn those CM points that you were missing. There are, of course, some limitations to this.

First, an extension year must be applied for. The request and payment of the extension year fee must be submitted no later than December 31st of the original 3-year cycle, i.e., the original certification expiration date. The renewal fee must also be paid by that deadline.

If a CLSO or CMLSO chooses to use the extension year, they can only renew by Certification Maintenance points. They also cannot earn more points in the same categories if they have reached the maximum, just because it is a new year. Only new points in categories not fulfilled will be accepted.

Lastly, the extension year can only be requested once every other certification cycle and there is no "grace period" allotted to the fourth year, since the extension year serves as its own type of grace period. They also may not extend two cycles in a row. If the situation is not resolved by December 31st of the extension year, the CLSO/CMLSO will go to Inactive Status.

The Board of Laser Safety even gives you an example of what an extension year might look like: "Mr. Laser is a CLSO and his certification cycle ends December 31 of this year. He realizes he does not have the required 10 CM points and due to a number of factors cannot earn the points by the end of his cycle. He chooses to apply for an Extension Year and submits his application prior to December 31. Since he did not use an extension year during his previous cycle, he is eligible for one in his current cycle, so he is approved. When he receives notification from BLS that he is approved for an Extension Year, he may begin earning CM points to reach the 10 CM points required for renewal. Mr. Laser already earned the maximum number of points for his job (3 CM) and for attending conferences (4 CM), so he must earn 3 CM points in the remaining categories. He chooses to apply for a one-year membership at a BLS-approved organization for 1 CM point and then chooses to read laser-related journal articles for 2 CM points. At the end of the Extension Year, Mr. Laser has the 10 CM points needed for renewal and submits his CM worksheet and documentation to BLS by the December 31 deadline. He will not be eligible to apply for another Extension year during the following certification cycle, as the Extension Year may only be used every other cycle. His next cycle will be a three-year cycle."

You can visit the Board of Laser Safety website at lasersafety.org for more information on certification maintenance and the new extension year or watch the following informative video that was made by the BLS staff for your convenience.

You can also download the Certification Maintenance Manual here.

About BLS

The mission of the Board of Laser Safety (BLS) is to provide a means for the recognition of laser safety professionals through certification and to promote competency in the field of laser safety. BLS certification will enhance the credibility of a designated Laser Safety Officer, and demonstrate that individuals serving in the field have agreed to adhere to high standards of safety and professional practice. 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.