

## ORGANIZATIONS AND MANUFACTURERS IN FIELD OF LASER

Miroslav Radovanovic

University of NIS  
Faculty of Mechanical Engineering

### ABSTRACT

Today, laser make up a multi-billion EUR industry. Industrial manufacturers have developed innovative ways to use lasers to increase manufacturing efficiencies and product quality. At present time every year over 3000 laser machines for industrial application are installed in the world. In many countries they are formed laser associations or organizations. These laser associations or organizations assist the manufacturing industries by providing technical, product and service information. All of these associations and organizations promote lasers and laser applications. Web-sites of laser associations and organizations contain: news, promote of lasers, industrial product catalogs and links, laser applications and safety, a list of events and a directory of services. Many of these associations and organizations support research in laser technology on a non-profit basis. They are several manufacturers of lasers, and many manufacturers of laser machines and equipments.

### INTRODUCTION

Laser is undoubtedly the most promising and constructive invention of the second half of the 20<sup>th</sup> century. The laser is a young invention and it has found a wide range of applications in all the sectors such as telecommunications, measurement techniques and the processing of metal and non-metal materials. The laser have been accepted globally by the engineering sector as an accurate and economical product. Laser based technologies are increasingly accepted as a competent substitute in component manufacturing on account of improvements in efficiency, quality and productivity at affordable cost. Laser processing is fast becoming essential in nearly all manufacturing industries. Today, laser make up a multi-billion EUR industry. At present time every year over 3000 laser machines for industrial application are installed in the world.

The first laser, a ruby laser, was invented 1960 by T. Maiman, the first He-Ne laser was invented 1961 by A. Jovan, D. Herriot and W. Bennett, the first Nd:YAG laser was invented 1964 by Geusic, the first CO<sub>2</sub> laser was invented 1964 by C.K.N. Patel, the first excimer laser was invented 1976. The first industrial application of a laser was making holes in diamonds used a beam from ruby laser. Since that beginning, the use of laser technology has continued to be an impressive and successful story. The term LASER is an acronym for Light Amplification by Stimulated Emission of Radiation. A laser is a cavity, with mirrors at the ends, filled with material such as crystal, glass, liquid, gas or dye. It is a device that produces an intense beam of light with the unique properties of coherence, collimation and monochromaticity. Typical lasers use electricity to create coherent light. Laser light can be different colors of the visible light spectrum, or can be invisible when the light is ultraviolet or infrared.

From laser surgery to CD players and grocery-store checkout scanners, our daily lives are enhanced by a basic discovery that was originally thought by some to have no practical uses whatsoever. Lasers are used in almost all important sectors of

industry, such as automotive industry, electrical industry, metal-working industries and others. In USA, the automotive industry and the metal-working industries are the biggest customers for lasers. In Asia, the electrical and semiconductor industry is the laser supplier's most important customer. In Europe, the metal-working industry and automotive industry are the biggest customers for lasers. Typical areas for applications of lasers are: printing technology, soldering, marking, drilling, cutting non-metals, cutting metals, sintering, heat condition welding, polymer welding, welding metals, hard soldering, hardening, heating, brazing, cladding. Some of these applications can be performed by lasers alone, but for many the justification is purely economic. For many applications, laser processing is the most precise, economical method available. For some, laser processing is the only method. Given the speed, flexibility and precision of laser processing, the cost savings are dramatic and the payback rapid.

In Germany, in 1989, year, it is investigated in laser equipment 804.5 million EUR. From this in laser equipment for: material processing 222.5 million EUR, research and development 143 million EUR, information technique 141.5 million EUR, communication 135 million EUR, medicine 118 million EUR, measure technique 34.5 million EUR and printer technique 10 million EUR. Figure 1 shows the percentages of investigation in laser equipment.

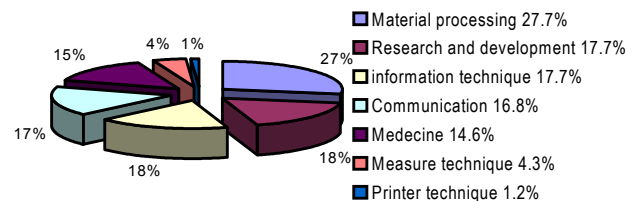


Figure 1. Percentages of investigation in laser equipment

Many types of lasers have been developed, but very few may be employed in a practical sense by industry. In laser equipment it is installed: semiconductor lasers 30%, CO<sub>2</sub>-lasers 22%, solid-state lasers 17%, ion lasers 13%, He-Ne lasers 7%, excimer lasers 4%, dye lasers 3% and other lasers 4%. Figure 2 show the percentages of installed lasers.

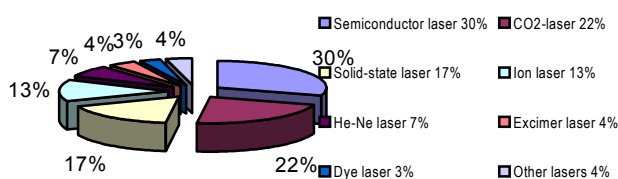


Figure 2. Percentages of installed lasers

The two most commonly used lasers are the CO<sub>2</sub> lasers and the Nd:YAG lasers. It is probably fair to say that of these two,

the CO<sub>2</sub> laser is the most versatile. Today, there is no doubt that the CO<sub>2</sub> laser is the most useful one for metalworking.

## LASER ASSOCIATIONS AND ORGANIZATIONS

In many countries they are formed laser associations or organizations. They assist the manufacturing industries by providing technical, product and service information. All of these associations and organizations promote lasers and laser applications. Web-sites of laser associations and organizations contain: news, promote of lasers, industrial product catalogs and links, laser applications and safety, a list of events and a directory of services. Many of these associations and organizations support research in laser technology on a non-profit basis. In table 1 is shown some of these associations and organizations and their web-sites. In table 2 are shown laser institutes, in table 3 are shown laser centres, and in table 4 are shown laser laboratories.

Table 1. Laser associations and organizations

No	Laser associations	Web-site
1	American Welding Society (AWS)	www.aws.org
2	European Laser Applications Network (ELAN)	www.ailu.org.uk
3	International Laser Display Association (ILDA)	www.ilda.wa.org
4	International Society for Optical Engineering	www.spie.org
5	Japan Laser Processing Society (JLPS)	www.jlps.gr.jp
6	Laser and Electro-Optics Manufacturer's Association (LEOMA)	www.sfo.com
7	Lasers and Laser Engineering	www.lasers.org.uk
8	Optical Soc. of America (OSA)	www.osa.org
9	Optronics Ireland	www.tcd.ie
10	Russian Federal Research Center RAMET	www.girmet.ru
11	The Association of Industrial Laser Users	www.ailu.org.uk
12	The Entertainment Laser Association	www.ela.org.uk
13	The International Society for Optical Engineering (SPIE)	www.spie.com
14	The Laser & Electro-optics Manufacturer's Association (LEOMA)	www.sfo.com
15	UK Laser and Electro-Optics Trade Association	www.ukleo.org

Table 2. Laser institute

No	Laser institute	Web-site
1	Arizona State University – MEMS	www.eas.asu.edu
2	Beckman Laser Institute	www.bli.uci.edu
3	Columbia University – MRL	www.mrl.columbia.edu
4	Edison Welding Institute (EWI)	www.ewi.org
5	Fraunhofer Institute for Laser Technology (ILT)	www.ilt.fhg.de
6	Institute of Optics – Rochester	www.optics.rochester.edu
7	Institute of Electronic Structure and Laser (IESL)	http://safety.web.cern.ch
8	ISLT TU Vienna	www.tuwien.ac.at
9	Laser Institute of America (LIA)	www.laserinstitute.org
10	Laser Palace – Lawrence University	www.pkal.org
11	Rice University – Laser Science	www.ruf.rice.edu
12	Rockwell Laser Institute	www.rli.com
13	The Welding Institute (TWI)	www.twi.co.uk
14	UMIST University of Manchester Institute of Science and Technology	www.me.umist.ac.uk
15	University of Twente (WB)	www.wa.wb.utwente.nl
16	University of Wisconsin	www.engr.wisc.edu
17	University St Etienne	www.univ-st-etienne.fr
18	Lund university – Lund laser centre (LLC)	www.llc.fysik.lth.se
19	Masquarie university – Centre for lasers and applications	www.mpec.mq.edu.au
20	Oklahoma State University – Laser Center	www.okstate.edu
21	Umea University – Laser Physics Group	www.phys.umu.se
22	Lulea University of Technology	www.mb.luth.se

23	Michigan state university-MSU laser laboratory	<a href="http://photon.cern.msu.edu">http://photon.cern.msu.edu</a>
24	Optics and Laser Group, Adelaide University, Australia	<a href="http://www.physics.adelaide.edu.au">www.physics.adelaide.edu.au</a>
25	tsinghua University	<a href="http://www.tsinghua.edu.cn">www.tsinghua.edu.cn</a>

Table 3. Laser centres

No	Laser centres	Web-site
1	Australian National University Laser Physics Centre	<a href="http://laserspark.anu.edu.au">http://laserspark.anu.edu.au</a>
2	Center for Research and Education in Optics and Lasers	<a href="http://lorien.creol.ucf.edu">http://lorien.creol.ucf.edu</a>
3	Fraunhofer Center for Laser Technology (CLT)	<a href="http://www.clt.fraunhofer.com">www.clt.fraunhofer.com</a>
4	Laser Physics Centre ANU - Canberra	<a href="http://laserspark.anu.edu.au">http://laserspark.anu.edu.au</a>
5	Laser Science Centre - Queensland	<a href="http://www.physics.uq.edu.au">www.physics.uq.edu.au</a>
6	Laser Spectroscopy Center – Wisconsin at Madison	<a href="http://www.chem.wisc.edu">www.chem.wisc.edu</a>
7	Laser zentrum Hannover	<a href="http://www.lzh.de">www.lzh.de</a>

Table 4. Laser laboratories

No	Laser laboratories	Web-site
1	Bell laboratories	<a href="http://www.bell-labs.com">www.bell-labs.com</a>
2	Lappeuranta University of Technology	<a href="http://www.lut.fi">www.lut.fi</a>
3	Laser and Electro-Optics Research Laboratory (BYU)	<a href="http://www.ec.byu.edu">www.ec.byu.edu</a>
4	Laser Laboratory – Hope College	<a href="http://www.chem.hope.edu">www.chem.hope.edu</a>
5	Laser Laboratory – Hunter College	<a href="http://www.ph.hunter.cuny.edu">www.ph.hunter.cuny.edu</a>
6	Laser Laboratory – Lawrence College	<a href="http://www.lawrence.edu">www.lawrence.edu</a>
7	Laser Laboratory – Lynchburg College	<a href="http://www.lynchburg.edu">www.lynchburg.edu</a>
8	Laser Laboratory – Western Maryland College	<a href="http://www.wmc.car.md.us">www.wmc.car.md.us</a>
9	Laser Optics&Spectroscopy Group	<a href="http://www.lsr.ph.ic.ac.uk">www.lsr.ph.ic.ac.uk</a>
10	Lawrence Berkeley National Laboratory	<a href="http://efssun.lbl.gov">http://efssun.lbl.gov</a>
11	Penn State's Applied Research Lab.	<a href="http://www.arl.psu.edu">www.arl.psu.edu</a>
12	Semiconductor Laser Laboratory	<a href="http://sll.ccsm.uiuc.edu">http://sll.ccsm.uiuc.edu</a>
13	Ultrafast Laser Laboratory (BNL)	<a href="http://www.inst.bnl.gov">www.inst.bnl.gov</a>
14	Berkelet-Laser Manufacturing Laboratory	<a href="http://enler.me.berkeley.edu">http://enler.me.berkeley.edu</a>

## LASER MANUFACTURERS

There are several manufacturers of lasers, and many manufacturers of laser machines. In table 5 are shown manufacturers of lasers. Industry leaders of laser manufacturers are: Coherent Laser Group, Ferranti Photonics, Rofin-Sinar, Spectra-Physics and Trumpf. Laser machines are product of high technology. They present complex hardware and software equipment. Manufacturers of machines

incorporate laser, optical system for laser beam transmission, and processing head in mechanical machines with CNC unit and build laser machines. In table 6 are shown the most known manufacturers of laser machines and their web-sites. Industry leaders of laser manufacturers are: Amada, Bystronic, Cincinnati, ESAB, Hahn%Kolb, Lumonics, Mazak, Messer. Prima Industrie, Rofin, Salvagnini and Trumpf.

Table 5. Laser manufacturers

No	Laser manufacturers	Web-site	No	Laser manufacturers	Web-site
1	Aculight	<a href="http://www.aculight.com">www.aculight.com</a>	23	Melles Griot	<a href="http://www.mellesgriot.com">www.mellesgriot.com</a>
2	Alpha Lasers	<a href="http://www.alphalasers.com">www.alphalasers.com</a>	24	Metrologic Instruments	<a href="http://www.metrologic.com">www.metrologic.com</a>
3	Big Sky Laser Technologies	<a href="http://www.bigskylaser.com">www.bigskylaser.com</a>	25	Optlectra	<a href="http://www.optlectra.com">www.optlectra.com</a>
4	Blue Sky Research	<a href="http://www.blueskyresearch.com">www.blueskyresearch.com</a>	26	Opto Power Corporation	<a href="http://www.optopower.com">www.optopower.com</a>
5	Bonneville Technologies	<a href="http://www.bonnevilletech.com">www.bonnevilletech.com</a>	27	Oxford Lasers	<a href="http://www.oxfordlasers.com">www.oxfordlasers.com</a>
6	Cilas	<a href="http://www.cilas.com">www.cilas.com</a>	28	Parallax Technology	<a href="http://www.parallax-tech.com">www.parallax-tech.com</a>
7	Coherent	<a href="http://www.cohr.com">www.cohr.com</a>	29	Photonics Industries	<a href="http://www.photonix.com">www.photonix.com</a>
8	Continuum	<a href="http://www.ceoi.com">www.ceoi.com</a>	30	Photonics Solutions	<a href="http://www.psplc.com">www.psplc.com</a>
9	Cutting Edge Optronics	<a href="http://www.ceolaser.com">www.ceolaser.com</a>	31	Positive Light	<a href="http://www.posilight.com">www.posilight.com</a>
10	EKSPL	<a href="http://www.ekspla.com">www.ekspla.com</a>	32	Power Technology	<a href="http://www.powertech.com">www.powertech.com</a>
11	Ferranti Photonics	<a href="http://www.ferrantiphotonics.com">www.ferrantiphotonics.com</a>	33	PRC Laser	<a href="http://www.prcclaser.com">www.prcclaser.com</a>
12	Lambda Physik	<a href="http://www.lambdaphysik.com">www.lambdaphysik.com</a>	34	Q-Peak	<a href="http://www.qpeak.com">www.qpeak.com</a>
13	LASAG Industrial Lasers	<a href="http://www.lasag.com">www.lasag.com</a>	35	Quantronix	<a href="http://www.quantron.com">www.quantron.com</a>
14	Laser Labs	<a href="http://www.laserlabs.com">www.laserlabs.com</a>	36	Resonetics	<a href="http://www.resonetics.com">www.resonetics.com</a>
15	Laser Physics	<a href="http://www.laserphysics.com">www.laserphysics.com</a>	37	Rockwell Lasers	<a href="http://www.rli.com">www.rli.com</a>
16	Laser Power Corporation	<a href="http://www.laserpower.com">www.laserpower.com</a>	38	Rofin-Sinar	<a href="http://www.rofin-sinar.com">www.rofin-sinar.com</a>
17	Latronix AB	<a href="http://www.latronix.se">www.latronix.se</a>	39	Spectra-Physics	<a href="http://www.splasers.com">www.splasers.com</a>
18	Lee Laser	<a href="http://www.leelaser.com">www.leelaser.com</a>	40	Spectron Laser Systems	<a href="http://www.spectron.co.uk">www.spectron.co.uk</a>

19	Lexel Laser	www.lexellaser.com	41	Synrad	www.synrad.com
20	Liconix	www.liconix.com	42	Trumpf	www.haas-laser.com
21	Light Solutins	www.lightsol.com	43	TRW	www.trw.com
22	LumenX Technologies	www.dyelaser.com	44	Unitek Miyachi Lasers	www.unitekmiyachilasers.com

Table 6. Laser machine manufacturers

No	Laser machine manufacturers	Web-site	No	Laser machine manufacturers	Web-site
1	Amada	www.amada.com	28	Mazak	www.mazaklaser.com
2	Arnold	www.arnold-rv.de	29	Mecanumeric	www.mecanumeric.fr
3	Baasel Lasertech	www.baasel.de	30	Messer Cutting Systems	www.messer-cs.de
4	BLM-ADIGE USA	www.blmgroup.com	31	Mitsubishi Laser	www.mitsubishi-world
5	Bystronic Laser.	www.bystronic.com	32	Modern Machine Tool	www.modernmachinetool.com
6	Cheval Freres	www.cheval-freres.fr	33	Motoman	www.motoman.com
7	Cielle	www.ciellecnc.com	34	Omega Laser	www.a1.nl/omega-laser-systems/
8	Cincinnati Incorporated	www.cincinnati-tools.com	35	OTO Mills USA	www.otomills.com
9	Convergent Prima	www.convergentprima.com	36	Photonics Spectra	www.photonicsspectra.com
10	Cutting Edge Optronics	www.ceo-laser.com	37	Precitec	www.precitec.com
11	Edwards Pearson	www.edwards-pearson.co.uk	38	Prima Industrie	www.primaindustrie.com
12	Electrox	www.electrox.com	39	Profile 600	www.profile600.co.uk
13	Embassy Machinery	www.embassy-mach.co.uk	40	Pullmax	www.pullmax.com
14	ESAB	www.esab.com	41	Rofin	www.rofin.com
15	FANUC Robotics North America	www.fanucrobotics.com	42	RPA Limited	www.rpaservices.com
16	Ferranti Photonics	www.ferrantiphotonics.com	43	Salvagnini	www.salvagnini.it
17	Franek Laser&Fab Systems	www.franeklaser.com	44	SEI	www.seispa.com
18	GSI Lumonics	www.gsilumonics	45	Sondronic Automotive	www.sondronic.com
19	Haco	www.haco.com	46	Stripit/LVD	www.lvdgroup.com
20	Hahn&Kolb	www.hklaser-systems.com	47	Thinklaser	www.thinklaser.com
21	Hana Laser	www.hanalaser.com	48	Trotec	www.trotec.net
22	Koike	www.coikeox.co.jp	49	Trumpf	www.trumpf.com
23	Lasag AG	www.lasg.com	50	Yamazaki Machinery UK	www.mazakeurope.com
24	LaserCut	www.lasercutinc.com	51	Universal laser systems.	www.ulsinc.com
25	LPKF Laser&Electronics	www.lpkf.com	52	Virtek Industrial Laser	www.virtek.ca
26	Lumonics	www.lumonics.com	53	Wightman Stewart	www.wightmanstewart.co.uk
27	Marbach	www.marbach.com	54	Whitney	www.wawhitney.com

## CONCLUSION

Today, industrial lasers are now classed as "conventional" technology in many sectors of industry. There are several manufacturers of lasers, and many manufacturers of laser machines. Industry leaders of laser manufacturers are: Coherent Laser Group, Ferranti Photonics, Rofin-Sinar, Spectra-Physics and Trumpf. Industry leaders of laser manufacturers are: Amada, Bystronic, Cincinnati, ESAB, Hahn&Kolb, Lumonics, Mazak, Messer, Prima Industrie, Rofin, Salvagnini and Trumpf. Laser associations and organizations assist the manufacturing industries by providing technical, product and service information. All of these associations and organizations promote lasers and laser applications.

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[www.e4production.net](http://www.e4production.net)

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