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IYL 2015 in Poland

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***Abstract*—Light plays a key role in human's life. Without light there will be no human life environment. Technologies based on light, called photonics, decide of the development of our civilization. The role of photonics is constantly increasing, especially in such fields as energy, education, agriculture and health. The UN has established the International Year of Light and Light - based Technologies – IYL2015 [1]. The organizers of IYL2015 events are professional organizations, communities, educational organizations, non-profit ones, technological clusters and platforms, but also private sector. The aim is to increase the social consciousness about the role of light and photonics in building of our civilization. This sort of recognition is necessary as a needed component of the development process of the society. Introduction of new technologies, like completely new kind of lighting, new diagnostic and therapeutic methods, new sources of energy, etc., must meet with social acceptance. In the opposite case, isolated development of infrastructure, will meet with obstacles. In Poland, the professional events, technical, trade fairs and outreach ones, are organized in the framework of the IYL2015 by Photonics Society of Poland, Polish Physical Society, Polish Platform of Photonics Technologies, etc. The paper summarizes the issues combined with the organization of the IYL2015 globally and in Poland. Extended version of this paper was published in Polish [2]. The paper is a part of a cycle of articles devoted to analysis of global processes of photonics development. Previous papers concerned initiatives Photonics21 in Europe [3-4], NPI – National Photonics Initiative in USA [5], and development of optical sciences in Poland [6-15].**

***Keywords*—light, light technologies, optoelectronics, photonics, lasers, laser technology, lighting, medical photonics, photovoltaics, optical fibers, technical infrastructure, civilization development, national economy**

I. Light is Life and Civilization

THE IYL2015 is an event without a precedence. It is an interdisciplinary, educational, dissemination and outreach project of global character represented by UNESCO and organized across the globe by over 100 main partners – recognized science, research and technical institutions; universities; professional associations; foundations; non-governmental organizations; and major social media in the Internet. Etymology of the word light is probably prehistoric, Latin lux, Greek φως, but also divine light, fiat lux. The world optics [ὀπτική] stems from the ancient Greek and means „look". The main emphasis during the IYL will be lighting. On one hand we are facing denser and denser lighting in highly urbanised area of developed countries, even with a sort of unintentional environmental pollution with light, while on the other hand one has to remember that over 25% of humanity is living totally out of the reach of electrical grid. If we consider the presence of light and lighting, we also have to think of the painful lack of lighting. The issue of lack of infrastructural lighting, as a visible sign of developed civilization (abandonment, shameful issue, but also a challenge) in many regions of our planet, is a subject of effective activities of numerable organizations, governmental and non-governmental alike. IYL draws attention of the world public opinion on the lit world and also for the significant part of the world that is not illuminated after dusk. Installing the power supply in large parts of the world is not possible for many reasons - political, economic, organizational, social and others. Rare population of large rural areas, local wars, lack of stable and dependable local administration, a considerable distance from the centres of civilization, are just some of the reasons for the lack of electric lighting. No lighting deepens the distance to civilization, inhibits education, deteriorating health, prevents reasonable development and access to health services. IYL draws attention to the activities of organizations such as GOGLA [Gobal-Off-Grid-Lighting-Association.org], LUTW – Light-up the World [lutw.org] and others. This substantial lack of light of global scale concerns more than 1.5 billion people. For those people remain poisonous chemical lamps and candles. IYL will try to do every effort to organize more lighting for areas outside the power grid, like efficient LED lighting powered by batteries and charged during the day from photovoltaic panels. Funds are needed to purchase such lamps. One of the catchy heavy weight slogans of IYL is "Enable study after the Sunset".

Light plays a key role in human life. Light has developed our sense of sight. Without light, there would be no life in our environment. The Sun is the main source of light for us. Over 44% of the energy of the electromagnetic radiation of the Sun, which reaches the Earth is in the visible spectrum (400-700 nm). Technologies based on light, referred to as photonics, decide now about the development of our civilization. The role of photonics will continue to grow, especially in areas such as fabrication (laser additive manufacturing), smart space (sensors), energy, education, agriculture, and health. The United Nations, within the framework of UNESCO's action, established the IYL [light2015.org]. The organizers are professional bodies, scientific, research and technical, social, educational, clusters and technology platforms, as well as private partners and community networking sites. The initiative to participate actively in IYL was undertaken by more than 100 professional associations and institutions from nearly 90 countries.

IYL Partnership has already been established in 2010 and consists of a number of scientific, technical and public institutions. Some actions were initiated earlier but the culmination of the preparation takes place right now, also in Poland. The largest and the most influential photonic organizations of global extent, participating actively in the IYL are OSA - Optical Society of America, SPIE - The International Society for Optics and Photonics, The IEEE

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Photonics Society, The International Commission for Optics ICO, International Commission on Illumination CIE, and others. Some agendas of the EU are involved in the organization of the IYL. European institutions engaged in IYL are: European Physical Society (EPS), the Abdus Salam International Centre for Theoretical Physics (ICTP), European Optical Society (EOS) and others. Local organizations include: American Institute of Physics AIP, German Physical Society DPG, Polish Physical Society PTF, Photonics Society of Poland PSP, and others. The general aim is to increase public awareness of the role of light and photonics in the development of our civilization. Such awareness is required as a component of the development process. The introduction of new technologies, like completely new type of lighting, new methods of medical diagnosis and treatment, new energy sources and new methods of food production, must meet with public acceptance. Otherwise, the politically and socially alienated infrastructural development initiatives, even very modern, encounter many obstacles, if only are at all possible.

II. IYL IN INTERNET

The global coordination junction point of IYL is a central web portal light2015.org. There is also a rich network of connected local web sites to the central one. These are professional ones, community, research and technical, as well as web blogs. These portals present light in all possible aspects like: natural, environmental, anthropological, psychological, sociological, civilization, scientific, space and astronomical, physical, optical, scientific, technical, industrial, application oriented, domestic, office, photonic, automobile, historic, literary, cultural, painting, holographic, photographic, computer, graphics, informatics, mystical, religious, comic, and many other. Immediately after the opening of IYL web site, and especially after its significant enlargement and enrichment in July 2014, there was created around this site a number of additional thematic portals of various kinds – outreach, discussion, information, professional and blogs. There is an interesting chapter on the role of women in the science of light. Other major portals of scientific and professional associations, as well as the photonic companies started to establish permanent links to the IYL portal. Links are not only passive but contain additional dynamic multimedia materials, comments, etc. All this creates a virtual global social space of light. To participate in this very new and interesting experiment is a must, also for relevant representatives of light science and technology in Poland.

Is social capital reflected seriously on Facebook or Twitter? If anyone doubts this, it is worth to study in more detail the following logical and very surprisingly full list of 20 ways to be a part of such a useful global action that is IYL [facebook.com/IYL2015]. This list is very alive. The response to the list has already thousands of rich entries. Each entry means some action, a bigger or smaller but movement, and the whole activities add up to an excellent portrait of the social interest in the light. There are numerable entries by private individuals, but also representatives of social, scientific and technical institutions. There are declarations of specific actions, bringing very concrete results. There is more and more information about upcoming events, conferences, meetings, social activities, popular publications, contests, happenings, etc. There are also requests for organizing lectures popularizing photonics, with visits to schools by the experts invited to deliver a lecture. There are offers for visits in open research laboratories to the public and the organization of public presentations in leading laboratories. There are descriptions by individuals of their own experiences with the light in different private and professional situations. Facebook shows a real life of light communities. The proposed activities are: 1- Write a post for the IYL blog. 2- Get updates on activities and developments by following #Light2015 on Twitter. 3- Like #Light2015 on Facebook and share our updates with your friends. 4- Submit a letter to the Editor for your local newspaper that discusses the importance of light and light based technologies. 5- "Adopt" a local school and provide a classroom demonstration on optics. 6- Create a video or slide presentation describing a light-based technology in our daily lives and post it online (YouTube.com, SlideShare.com, etc.). 7- Work with the local OSA student chapter to host an IYL-themed event for undergraduate or graduate students at your academic institution. 8- Promote IYL at your institution or company by displaying an IYL poster. 9- Encourage members of your community to participate in the What Will You Do for IYL 2015? social media contest. 10- Donate an optics education kit to students and teachers in developing countries, or contribute to a travel grant to help advance the career of a promising student. 11- Attend an IYL event in 2015 (check light2015.org for upcoming events). 12- Organize a local IYL-themed bike or running race with participants using LED lights. 13- Host a community Laser tag event. 14- Sponsor a local Festival of Light. 15- Visit www.light2015.org to learn about why light matters, read science stories and find cool resources. 16- Reach out to your local museum, offer to organize a light-in-art exhibition or create a hands-on optics display. 17- Host an IYL-themed discussion panel at your school or company. 18- Develop an international cooperative event like a twitter chat or a light-related activity that people around the world can participate in. 19- Link to the IYL website from your organization's website. 20- Contact five friends to let them know of your involvement and encourage their participation in IYL 2015. IYL is also present and active at [twitter.com/IYL2015], and linked with [light2015blog.org]. Light twitters are available at global addresses [@IYL2015]; [@Light]; [@lighting]; but also local like Italian [@Luxemozione]. IYL has already opened a lot of such Internet community actions even before its official opening. There is no doubt, that these actions will be continued after IYL is closed. IYL is expected to leave behind a permanent and valuable footmark.

III. LIGHT APPLICATIONS

Light applications is an immense field of science, research and technology, treated here only in a nutshell. Light technology is the use of the science of light in practice. The areas of technology known as optics, photonics, and optoelectronics, includes uses of light in manufacturing, energy generation, medicine, biology, agriculture, food production, telecommunications, photography, reprographics, printing, industrial, functional microsystems - such as MOEMS, culture, and plays an essential role in the modern development of civilization. Light, as the technology and

technique, generates a large part of the national income of contemporary societies. We list here only a few areas of photonics and optoelectronics. Some of them are closely related to the electronics, a part of computer science, mechatronics, chemistry, micro- and nano-systems technology. We are talking about a growing number of technical applications of light, like photonics, additive laser manufacturing technologies, laser 3D printing, photovoltaic energy, lighting, image processing, optical coherence tomography, holographic imaging, three-dimensional television, three-dimensional imaging of the free space, optical virtual reality, photonic sensors, open optoelectronic and photonic optical fibre transmission links, multi-terabit Internet, optical quantum cryptography, quantum optical communications, laser production systems, photonic security systems, photonic documentation systems, medical laser endoscopy, and many others.

Lighting of a confined space is more complicated with the development of complex urban systems. Increasing the density of lighting in urban areas, gives rise to problems of environmental pollution by artificial lighting. Increased light density is associated with lower unit costs of installation and operation of lighting systems. There is no doubt that lighting density will continue to grow. Light technology requires light sources and light detectors. A variety of efficient light sources is also growing. The sources use different mechanisms of generation of light. Recently, however, a technological breakthrough in the field of light emitting diodes, and reduction of costs, causes massive transition from traditional incandescent sources for semiconductor ones. LED lighting is used in automotive engineering, municipal areas, in industry and in the immediate environment of humans. Light technology embraces also the photovoltaics, entering rapidly in public and private space even in so much northern country like Poland. In the southern regions of the world, solar photovoltaics and mirror power factories, after some further development of the technology, seem to be very likely to meet a lot of local domestic energy needs. Recently there was shown that the mirror light energy plants are able to work with supercritical steam, which significantly increases the efficiency of energy production in comparison with classical techniques based on subcritical water steam. If only photovoltaics technology allows a low cost wallpapering of roofs and paved roads with a rugged layer of photosensitive material, of sufficient efficiency, one may completely alter the world energy situation. The same concerns photo-emissive wallpapers. The use of light are also laser sights, rangefinders, laser guns, heat/light-seeking missiles. Big factories of light are synchrotrons and free electron lasers of multi-kilometre length. Techniques for the sub-diffraction imaging in the far field use nonlinear optical phenomena, such as plasmonic assistance, quantum dots, or STED microscopy (stimulated emission depletion). Other types of over-resolved microscopy are: PALM (photoactivated localization) and STORM (stochastic optical reconstruction). These techniques are used particularly effectively for biological imaging. Computer optical tomography (coherent, polarized) is combined with other techniques, e.g. nuclear, X-ray, ultrasound) to give new opportunities to ultra-precise differentiating of biological tissue and medical imaging. Contemporary microscopy images also in three dimensions. This area also observes a considerable progress. There are applied such techniques as light sheet LSM microscopy.

IV. Photonics and IYL in Poland

Polish R&D Community of photonics is gathered in a few active organizations and institutions like: Photonics Society of Poland [photonics.pl], Polish Physical Society [ptf.net.pl], Section of Optics of PPS [sekcjaoptyki.zut.edu.pl], Polish Optoelectronics Committee of Association of Polish Electrical Engineers [pkopto.ise.pw.edu.pl], Section of Photonics – Committee of Electronics and Telecommunications, Polish Academy of Sciences [keit.pan.pl], [if.pw.edu.pl/~opto/so-keit], IEEE Poland Section [ieee.pl] and Photonics Society Chapter [ieee.pl/node/70], Polish Technology Platform in Photonics [pptf.pl], Mazovian Optocluster [optoklaster.pl], National Economic Chamber in Electronics and Telecommunications [kigeit.org.pl], National Chamber in Advanced Technologies [iztech.pl], photonics industry, R&D governmental agencies, university laboratories, Maksymilian Pluta Institute of Applied Optics [inos.pl], ITE and ITME Institutes in Warsaw, etc. Photonics is developed in at least a few tens of university laboratories (Faculties of EE, Physics, Mechatronics, Optics), a few tens of small and medium innovative businesses. There are a few bigger photonics firms like: Vigo Systems [vigo.com.pl], Laser Technology Center CTL [ctl.com.pl], PIT-Radwar (Bumar-Elektronics) [pitradwar.com], Industrial Center of Optics – PCO [pcosa.com.pl], INOS [inos.pl], Inframet [inframet.pl], and other. VIGO is a world leader in manufacturing of non-cooled IR detectors. One of VIGO detectors was used on board of the Mars Rover. CTL is a manufacturer and distributor of lasers for medicine, industry, schools and R&D laboratories. INOS is a manufacturer of advanced optical equipment. Almost all of these communities are involved in organization of the IYL in Poland.

The educational and outreach role of social Internet networks for disseminating such initiatives as IYL in Poland, especially among young people, is now abruptly increasing, and is just not to miss. In Poland, these portals are still underestimated by official institutions, including educational and scientific ones. On the other hand, they are very much appreciated by the young people. Virtually all of these sites having keyword IYL have already considerable number of interconnections and links and often lead to quite interesting content. It is a durable sign of the times. Virtual space slowly builds new social capital. This phenomenon combines, strengthens, and intertwines these actions that can be performed in the Internet space with real actions. In the modern scientific young community these two layers of activities are so closely linked that sometimes remain indistinguishable. In many cases it is still unacceptable to the older generation of the scientific community. Light and lighting technologies are closely related to science and technology, but also with the sense of sight and thus with the cultural and artistic creativity. Culture, at least in many of its areas is subject to intense implementation in the Internet. We have a common denominator. Tell me please, what is lacking in the quoted list of proposed activities for IYL published on Facebook? This is a full definition of well-designed and really useful "Social Festival of Light"?

It is worth to mention the professional journals active in photonics in Poland: Optica Applicata published by Wrocław University of Technology (prof.W.Urbańczyk), Opto-Electronics Review – published by Military University of Technology (prof.A.Rogalski), Bulletin of Polish Academy of Sciences, Technical Sciences – Section of Optoelectronics (prof.W.L.Woliński) [bulletin.pan.pl], International Journal of Electronics and Telecommunications PAS [ijet.pl], Photonics Letters of Poland, published by Photonics Society of Poland (prof.T.R.Woliński).

Polish Photonics Society, in cooperation with the national scientific, research, technical and economic communities active in photonics, has planned IYL celebrations and a number of significant scientific, scientific and technical and economic conferences and exhibition. These are events organized regularly by the national professional photonics communities, but during the 2015 Year of the Light they will have added special celebrative dimension – to join in this way the global celebrations. The Board of PPS, chaired by prof. Thomas Wolinski from the Department of Physics, Warsaw University of Technology has decided to organize the Third Conference of the PPS combined with the Photonics Research and Industry Trade Show OPTONexpo. Leading scholars and administrators of photonics from around the globe were invited, and among them prof. John Dudley - Chairman and President of European Physical Society (2014) and President of IYL2015; prof. Philip Russell, 2015 Chairman of the OSA, dr Eugene Arturs, Secretary General of the SPIE. Further efforts are being made to invite representatives of other organizations, such as the EOS and the IEEE Photonics Society, as well as from the leading photonics research centres in the world. Below we mention a few of more important events planned for the IYL in Poland.

A foretaste of organized and co-organized IYL events by the PSP was the 21 October 2014 – declared as the Day of Photonics [photonics.pl], [16,17]. On 21.10.1983, the General Conference of Weights and Measures has declared the light speed to be c=299792458m/s. A Consortium of PSP, Faculty of Physics WUT and PPTF organized in WUT an ad hoc industrial exhibition gathering over 10 photonic innovative firms, a conference and a dynamic holographic show. The exhibit and show gathered many participants from the university, industry and wide public. The show was a real-time holographic projection of images on a big projection screen. The show was a demonstration of a novel projection technology developed at the Faculty of Physics, Warsaw University if Technology. This show was the second such a demonstration in the history. The projection was realized with the aid a spatial light modulator illuminated with a medium-power green laser. The modulator diffracts light and focuses it on the screen forming the desired intensity patterns. The input signal is acquired by a camera in a smartphone and transmitted via Wi-Fi to a laptop, which then performs the holographic calculations in real time using graphical processing unit GPU. Because of safety precautions, the power of the laser must be limited therefore the room is dimmed a bit so that the viewers can clearly see the projection. The appropriate distance between the projection device and the screen is above 10 meters. The show is accompanied by a slide show describing the technology. The key message to the viewers is the advantages of holography, i.e. the possibility of extreme miniaturization of pocket or handheld projectors of the future, and high energy efficiency of holographic image formation.

January and May 2015 – 35th and 36th editions of Wilga Symposium of Young Scientists on Photonics Applications and Web Engineering [wilga.ise.pw.edu.pl]; Symposium is organized by young researchers from ISE WUT [ise.pw.edu.pl]. Patrons of this Symposium are SPIE, IEEE and their Polish partners – PPS, IEEE Poland Section, and Committee of Electronics and Telecommunications PAS, and PKOpto SEP. Symposium is organized two times a year and the May edition gathers more than 300-350 young researchers, most of them Ph.D. students, active in optics, photonics and advanced electronics. The researchers are from Poland and neighbouring countries. Conference works are traditionally published in Proceedings SPIE.

The tenth International Conference on Integrated Optics, Sensors, Sensing structures and Methods is organized by prof.T.Pustelny on 2-6 March 2015 in Szczyrk. The major organizer is Photonics Society of Poland. Co-organizers of the Conference are the Committee of Electronics and Telecommunication of Polish Academy of Sciences, the Upper Silesian Division of the Polish Acoustical Society, in cooperation with the Optoelectronic Department at the Silesian University of Technology in Gliwice. The main goal of the Conference is to exchange knowledge in the scope of practical applications of integrated optics. The aim of the Conference is to present experiences in the field of technology and theoretical analysis of optoelectronic sensors and practical applications of sensing structures and systems as well as new methods in the field of metrology. The Conference contributes to extend relations between scientific groups and to enable the intensification of common cooperation for the development of practical optoelectronics. The list of topics includes, but is not limited to: optoelectronic sensors and sensing structures, components and circuits for optoelectronic sensors, nano- and microtechnology in integrated optics, integrated optical circuits for optical signal processing, active and passive waveguide components, modulators and switches, integrated planar waveguides, materials and fabrication technology for integrated optical and photonic circuits, mechatronics, characterization of linear and nonlinear optical waveguide devices, integrated optical circuits for optical signal processing, sensors for environmental monitoring, numerical and semi-analytical methods for the modelling of guided-wave optics, pattern recognition methods for applications in sensing techniques, new metrological methods in optoelectronics, integrated optics and sensor techniques.

LIGHT2015 is 23rd International Trade Show of Lighting Equipment organized in Warsaw on 25-27 March 2015. It usually gathers a few hundred lighting equipment vendors and distributors [lightfair.pl]. The scope is: architectural lighting, street, small architecture and signal, office and administrative buildings, housing and decorative, technical lighting for business and industry, specialized, scene, studio, club, discoteque and publicity, solid-state lighting, lighting appliances for health and beauty care, lighting components and accessories.

April 8-9, 2015 – IIIrd PSP Conference combined with international trade fairs on optoelectronics and photonics OPTON2015 in Warsaw [optonexpo.fairexpo.pl]; OPTONexpo Trade Fairs are organized every two years. IYL

edition is planned in the Warsaw Trade Fair Centre EXPO XXI. The event is a research, technical and industrial platform of ideas exchange in optics, photonics, optoelectronics and laser technology. They are also a platform for education, publishers, science, presentation of new solutions, etc. The fairs, in a sense, respond to the EU initiative to nominate the photonics as a priority technological area having fundamental meaning for the European economy. International partner for OPTONexpo are International Trade Fairs for Optics in Berlin [laser-optics-berlin.de/en]. The expo is accompanied by a PPS conference with well-designed tutorials on current topics in photonics. Some of the tutorials are designed for a broader technical audience interested in photonics and infrastructural development.

June/July 2015, IVth Polish Optical Conference, organized biannually since 2009 by Faculty of Physics Warsaw University and Faculty of Electrical Engineering, West Pomeranian University of Technology. The organizer is Section of Optics, Polish Physical Society, associated with the European Optical Society. The conference summarizes the achievements of research in pure and applied optics in Poland for the last two years.

September 2015 – National Conference on Optical Fibres and Their Applications, organized in Nałęczów. The motto of 2015 Conference will be 40 years of optical fibre research in Poland. Forty years ago the technological team of the late prof. Andrzej Waksmundzki of University of Maria Curie-Skłodowska in Lublin started the job. The national Optical Fibre Conference is organized every 18 months, by two technological laboratories in Lublin (Technical University of Lublin and UMCS) and in Białystok (Białystok University of Technology). Works of the conference are traditionally published in the series Proc. SPIE.

The 8th Congress on Application of Raman Spectroscopy in Art and Archaeology will be organized in Wrocław on 1-5 September [raa.chem.uni.wroc.pl]. The RAA is an established biennial international event and represents works on the use of Raman spectroscopy technique in connection to the fields of chemistry and art-history, archaeology, conservation, restoration, degradation, archaeomentry, etc.

The Optics of Liquid Crystal Conference OLC-2015 will be organized Sopot on 13-18 September 2015 [olc2015.pl]. Topics of the OLC are: optics of complex anisotropic structures, nonlinear optics, 3D optics, displays, blue phase materials, design and synthesis of novel liquid crystal optical materials, LC in high power laser systems, diffractive waveplates, polarization gratings, holographic and stereoscopic systems, laser beam steering and optical switching, optical and photonic properties enhanced by surfaces and interfaces, photoalignment techniques and materials, photovoltaics and solitons in anisotropic materials, liquid crystal lenses.

November 2015 – National Symposium on Laser Technology (not confirmed, and possibly will be shifted to September 2016); The Symposium is organized by the national research and technical communities active in all aspects of laser technology – new lasers, underlying theories, technologies, various types of lasers, and all applications in industry, medicine, etc. This conference was held in Świnoujście, but will be shifted to a new place, possibly to Jurata. There was an idea to combine the Optical Fibre and Laser conferences but the relevant communities disagreed. 2015/2016 Jurata STL Symposium will be XIth in turn. The previous conferences were organized by Military University of Technology, WUT, West Pomeranian University of Technology. The works of STL are traditionally published in Proceedings SPIE [spie.org].

Traditional Science Festivals organized annually in the biggest academic cities of Poland (Warszawa, Kraków, Wrocław, Poznań,…) will have a lot of specially organized featured presentations combined closely to the IYL. These are the most appropriate events to do effective dissemination and outreach of photonics for the broadest public.

Science Center Kopernik in Warsaw is a very good institution to disseminate science, research and technology. This institution very actively reacts to such local and global occasions like the IYL and prepares dedicated programs and series of presentations. Special exhibition is under preparation relevant to IYL at this famous Centre. A similar institution in statutory duties is the Museum of Science in Palace of Science and Culture in Warsaw. This institutions and a number of other ones are obliged to dissemination of science and research are well prepared to organize relevant events directly combined and contributing to the IYL in Poland.

V. IYL2015 – CHANCE EQUALIZATION, EVOKING AMBITIONS

Declared by UNESCO, the International Year of the Light 2015 is an opportunity for national R&D photonics community (and perhaps also other related advanced technologies, working together with photonics like electronics, automation and robotics, materials engineering, technical physics) to go beyond their own, rather hermetic and inbred, area and way of actions, and show the wider social role of light and modern technologies in the creation of modern civilization. It is a very difficult task for the national scientific community, passing currently the generational and beliefs changes. To convince reliably the public, including decision-making circles, political, economic, industrial, business, as well as opinion leaders, of the necessity of the development of applied sciences in Poland, is the first step towards the construction of correct relations in developed countries, on a solid foundation cycle - education - science - industry, trust and social capital. Convincing the public, of rather sceptical attitude, for multiple reasons, to science far exceeds the strength of our whole national R&D community. This task is also for us – scientists, researchers and engineers, but not only for us.

Reliable and long-term foundation of progress and prosperity of society are applied sciences, such must be the activity motto of an engineer, especially the engineer doing research, and an engineer-scientist. The science must be very closely related to the industry, and the economy basing on sound principles. All other activities, which mainly are done by legislators in our country, facing apparent helplessness to properly organize a system of science – industry relations, are important, but only as an addition. These additives, beautiful and motivating, indicate mercilessly the direction of the necessary changes. We have maybe a beautiful body but without the spine. The current system is, as it turns out, quite durable. It does not even matter if it comes from the previous system, or our wise adaptation to the changing conditions of the present. It is now convenient to many communities. The factors to be considered are: hard, demanding cooperation with

the economy, encountering many financial and organizational troubles, positioning of the science and R&D only on the service level, severe alienation of academics, cherishing comfortable university habits, poor system support, low external evaluation of the society, lack of faith in the possibility of change in large parts of the scientific community, all of this is scarcely compatible with the modern concept of innovative knowledge-based society. Lack of willingness for continuous systematic learning, immediate updating of teaching, diligence in research and publishing activities, of a certain part of academics at technical universities, risk aversion, unwillingness to take a significant effort in the administration of conducting challenging research projects of national and European level, lack of skills and resources in order to encourage in the modern way the brightest students to activities and cooperation going far beyond the normal academic duties and remain at the university, legislators bogged down in legal and verbal formalisms of new laws, new statutes attacking symptoms and not the causes, persistent lack of courageous administrative and economic decisions in relation to science. All this does not promise for rapid entry of the local research communities into the first league of technology.

IYL - a great unique global initiative reflects, on the one hand, rapid technological change and the impact of photonics on the development of civilization and enhances, among other things, the daily lives of many people, on the other hand, shows the shortcomings of our civilization, and the disproportionality of distribution the wealth. One and a half billion people tonight without electric light, difficult to find a more appealing number at the beginning of the IYL. A challenge that will not be quickly addressed. Poland belongs to this part of the global community, which is today not worrying about the lack of lighting, but neither belongs to a narrow class of technology leaders. IYL showing the power of technology and the further development perspectives, inevitably raises a healthy reflection how to change the league and produces a number of stormy, sometimes quite controversial, thoughts, whether it is at all possible.

The list below contains some relevant sources, literature, but mainly links to global and national institutions, laboratories, research units, associations, conferences, publications, magazines, and related social networks, active with light and photonics.

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