



LASERLAB-EUROPE

The Integrated Initiative of European Laser Research Infrastructures IV

Grant Agreement number: 654148

WP9 – International Relations

D9.1

Report on International Relations

Lead Beneficiary: 1 – LU

Due date: M48

Date of delivery: M48

Project webpage: www.laserlab-europe.eu

<i>Deliverable Type</i>	
R = Report DEM = Demonstrator, pilot, prototype, plan designs DEC = Websites, patents filing, press & media actions, videos, etc. OTHER = Software, technical diagram, etc.	R
<i>Dissemination Level</i>	
PU = Public, fully open, e.g. web CO = Confidential, restricted under conditions set out in Model Grant Agreement CI = Classified, information as referred to in Commission Decision 2001/844/EC	PU

1 Introduction

The objective of this work package is to establish links to laser-related communities and networks outside Europe with the aim to promote laser science and research beyond the ERA, to exchange information on best practices between Research Infrastructures, and to promote Access opportunities offered by Laserlab-Europe to non-European users.

2 Task 1 – Relations with Centres and Institutes in other Global Regions

Lead partner: CLPU

Extensive links exist with research centres and facilities in the Americas with the United States, Argentina, Brazil, Ecuador, Peru, Mexico, in Asia with Japan, China, South Korea and India, in Africa with South Africa, and with Australia and Russia. The aim is to strengthen and consolidate the links by promoting user-training activities and especially the new transnational access possibilities offered by Laserlab-Europe through personal and on-site attendance at meetings and conferences in these countries, or through lecture and panel participation activities in which Laserlab-Europe is promoted.

Examples of such long-term links and new collaborations are listed in each periodic report. A few examples of long-term links are given below:

Laserlab-Europe partners maintain close relations to **Chinese** universities. As an example, two LU staff members have part-time appointments at the South China Normal University (SCNU), Guangzhou, resulting in many joint publications and exchange of personnel. The LU further is part of a joint research center on spectroscopy for agricultural applications together with Henan Agricultural University, Zhengzhou, and SCNU. VUA-LLAMS has a longstanding connection to USTC (University of Science and Technology China), a major institute in China, located at Hefei. In addition, VUA-LLAMS has set up collaborations in the field of Biophotonics & Biomedical Optics with the Beijing University of Technology (BJUT), with several exchanges of students. MUT is collaborating on laser plasma X-ray sources and applications with the Key Laboratory of Microstructured Materials, School of Physics Science and Engineering, Tongji University, Shanghai, China.

Together with the Palace Museum in Beijing, FORTH has established a common research laboratory “NIKI: Chine-Greece Laser Technology Joint Laboratory on Cultural Heritage” in July 2016. This international collaboration is a landmark in the study and conservation of the unique exhibits of the Palace Museum as it is based on the breakthroughs in the analytical methods, diagnosis and conservation of exhibits and monuments of cultural heritage utilizing laser technology that has been developed within IESL-FORTH as a result of the research also performed with the financial assistance and within the framework of the Laserlab-Europe programme.

HZDR closely collaborates with KPSI / QST in Nara, **Japan** focusing on the systematic comparison of PW laser performance for ion acceleration at KPSI and HZDR. This is based on a larger collaboration agreement with QST and on Japanese access grants.

CNRS-LOA has established close contacts with **South-East Asian** universities such as the Ho Chi Minh City University of Technology in Vietnam and the King Mongkut’s Institute of Technology Ladkrabang in Thailand. Together they have started the International School “Explore New horizons in Optics”, which aims at giving insight in modern optics impacting all fields of research and industry, including, for example, biology, medicine, chemistry, physics, and materials science. The School targets the most talented young students from less developed countries in South-East Asian countries in order to help them build future careers in close contact and with support from European laboratories.

PALS has a long-term, well established collaboration with the NSF ERC for Extreme Ultraviolet Science and Technology conducting application-motivated research with various sources of intense short-wavelength radiation at the Colorado State University in Fort Collins, CO, **USA**.

GSI-HIJ established an international networking activity called High Energy Class - Diode Pumped Solid State Lasers (HEC-DPSSL) in 2002, which since then holds regular workshops every 1.5 years between (current members) LLNL (USA), RAL CLF STFC (UK), LULI (France), HIJ - Uni Jena, HZDR, LMU/MPQ (Germany), HILASE (Czech Rep.), KAIST (South Korea) and ILE (Japan) where knowledge on high energy diode pumped laser development is exchanged. Results related to Laserlab-Europe JRA are playing a considerable role. The European members are also members of Laserlab-Europe. The latest, 11th workshop was held in South Korea, January 14-18, 2019. The group will now be extended by CEAP (China), which will host the next meeting in 2020.

The CEA-LIDYL was one of the beneficiaries of the CREMLIN project (2015-2018). CREMLIN, "Connecting Russian and European Measures for Large-scale Research Infrastructures", was an EC-funded project aiming at fostering cooperation between the European research infrastructures and the six megascience projects of the **Russian Federation**, among which the Exawatt Centre for Extreme Light Studies (XCELS), promoted by the Institute of Applied Science (IAP) of the Russian Academy of Sciences (RAS). Several of the events organized by CREMLIN discussed the possible cooperation between XCELS project and Laserlab-Europe and, as a consequence, Laserlab-Europe AISBL has been invited in 2019 to become a beneficiary of the follow-up H2020 project CREMLINPlus, which will start at the beginning of 2020. This will allow to further strengthen the cooperation between the European and the Russian laser science and applications communities.

An outcome of intensified international promotional activities is an increasing number of "international" users that Laserlab-Europe is hosting in its transnational access programme (up to 16% in terms of access units until the end of the project), a new opportunity, which is very much welcome by the Laserlab-Europe partners who now have the possibility to reach out to new communities, outside the EU.

3 Task 2 – Relations with International Laser Networks and Societies

Task leader: LU

Laserlab-Europe aims at strengthening links with international laser and laser-related societies and with networks in other global regions. Of particular interest are regions with developing laser communities such as Eastern European countries, Latin America, Africa and Asia. Relationships will be established or expanded with regional laser networks, such as the Iberoamerican Optics Network (RIO), the African Laser, Atomic, Molecular and Optical Sciences Network (LAM Network) and the African Spectral Imaging Network (AFSIN) or the Asian Intense Laser Network (AILN). Many of these networks share the aim of Laserlab-Europe in promoting collaboration in the areas of laser science and technology among research groups and in arranging platforms for discussions among representatives from laser facilities and members of user communities.

Laserlab-Europe has strong links to laser activities on the **African continent**. Historically, the African Laser, Atomic, Molecular & Optical Sciences Network (LAM Network, <http://lamoptinet.org>) played a major role in connecting African scientist with each other and with foreign centres, including LU/LLC, which also helped form the AFSIN (African Spectroscopy and Imaging Network <https://fos.cmb.ac.lk/afsin/>), coordinated by Prof. Jérémie Zoueu, National Polytechnical Institute, Yamoussoukro, Ivory Coast. Hands-on workshops were annually held during recent years, with the most recent ones in Senegal (2015), Burkina Faso (2017), Ivory Coast (2018) and in Cape Coast/Ghana (2019). The organization and lecturing at these workshops was largely made by Laserlab-Europe researchers (LLC), and realistic research equipment was built up by each of the participating groups, which now represent nine universities, in Senegal, Burkina Faso, Mali, Ghana, Ivory Coast, Cameroon, Kenya, Togo, and Sri Lanka. The research activities focus on advanced diagnostics for malaria, agricultural diseases and agricultural pest insects. They comprise laboratory work as well as active and passive remote sensing at considerable distances. Main economic sponsor for these activities is the International Science Programme, Sweden.

The Women in Africa foundation, true to its mission of contributing to the development of Africa through its women, organises the "Science by Women" programme with the aim to promote African women's leadership in scientific research and technology transfer and to foster the capacity of the research centres in their home countries. The main goal is to enable African women researchers and scientists to tackle the great challenges faced by Africa through research in health, agriculture and food security, water, energy and climate change, which can be transferred into products and technologies having impact on people's lives. ICFO is one of the hosting institutions in Spain for sabbatical fellowships for senior African women researchers.

Several discussions were held with representatives (A. Kramer DOE, J. J. Rocca CSU and F. Albert LLNL) of the newly established **LaserNetUS**, a collaboration between six academic and two national laboratory high-intensity laser facility in the United States (University of Nebraska-Lincoln, University of Michigan, University of Texas-Austin, The Ohio State University, Colorado State University, University of Rochester, Lawrence Berkeley National Lab and Stanford Linear Accelerator), with the aim to present Laserlab-Europe and strengthen links between the two structures. Contacts have also been intensified with the **Asian Intense Laser Network** (chair C. H. Nam).

In August 2019, a Panel Discussion on "National and Transnational Networks of Intense Laser Facilities: Impact for Science and User Communities" was organised during the conference on "X-ray lasers and coherent X-ray sources", held in San Diego in the frame of the SPIE Optics and Photonics Symposium. Representatives from three major Laser Networks participated: Sylvie Jacquemot for Laserlab-Europe, Jorge Rocca (CSU) for LaserNetUS and Do-Kyeong Ko (GIST, S-Korea) for the Asian AILN Network. Following an introduction of each network, questions from the audience concerning conditions for access to beamtime, in particular for scientists from countries outside the networks, IP issues, etc., were discussed. Representatives of the networks LaserNetUS and AILN also participated in the Laserlab-Europe Conference in October 2019 where the planned collaborations with Laserlab-Europe were presented.

A first outcome of these discussions is that, in response to the opening of Laserlab-Europe's transnational access programme to international users, LaserNetUS and AILN have opened their calls in order to provide access free of charge to some of their facilities to European Users. In addition, participation of representatives of these international networks in Laserlab-Europe's thematic workshops in order to share best practices and knowledge is being discussed.

In addition, links with international entities such as the **International Committee on Ultrahigh Intensity Lasers** (ICUIL) are reinforced. ICUIL finds its members predominantly in North America, the Asian/Pacific Area, and Europe, where the European members are almost exclusively members of Laserlab-Europe, making the Consortium a natural and strong ICUIL partner. In return, Laserlab-Europe benefits from participation in ICUIL's activities and conferences, from the close interaction with non-European laser research Infrastructures, and from new scientific directions, which are being pursued on a global level, such as novel laser-based particle accelerators.

Laserlab members participate actively in the biennial International ICUIL Conference, which focuses on the generation, amplification, compression, and measurement of high-intensity pulses as well as applications. ICUIL 2016 in September 2016 in Montebello, Canada, as well as ICUIL 2018 in September 2018 in Lindau, Germany, have been co-organised by Laserlab-Europe members.