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LASER-GO

Creating and Developing the Strategic Cluster Partnership in Photonics for Health

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COSME

D2.1: Partnership Goal Statement

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1 Why strategic partnership

The European Strategic Partnership for the Photonics in Health (LASER-GO) has been conceived and pursued with the purpose of creating a meta-cluster by gathering the existing knowledge clusters in the fields of photonics, optics and medical devices into the cross-regional network of ties that could facilitate the shared exploration of the third markets by leveraging the resources available at the Partnership level. Thus, the overall aim of the Partnership is to connect the cluster-based companies to the global markets via joint offers. More specifically, it is aimed to create leads for high-growth companies to access the value chains in the targeted markets by exploring the market needs for specific uses of photonics-driven technology applications developed and commercialized by the cluster companies across the Partnership.

As such the Partnership does not substitute the role of existing sectorial organisations which represent companies nationally nor does the Partnership assume any of the roles performed by companies themselves in pursuing their business-to-business contacts. The Partnership sees itself as an enhancer of the existing ties and existing networks, including those represented by sectorial organisations and individual company networks. The following document provides an overall explanation on how it plans to go about in achieving its mission, i.e. prospecting markets for the adoption of photonics for health uses.

1.1 The context of the partnership within a larger growth strategy

The existing alternatives for supporting and promoting company growth at regional level (such as trade missions, industry fairs, match-making events) are plentiful and, in many cases, rewarding, yet their function is primarily limited to assisting companies in making their products and services known to a wider world. Though the contacts emerging from those engagements can have a continuation and might lead to a closer integration into the existing value chains, those activities are limited to pursuing only few leads at a time and hence often lack the scale. One company can explore only a limited number of leads and each intermediary can facilitate only a limited number of contacts. More importantly, the planning of those activities often involves several layers of go-betweens – often it is not the companies themselves but the intermediaries that have their say on the setup of the B2B activities and contact facilitation. The personal aspect also plays a role: the establishment of working relations between companies working in different fields and within different organisational or cultural setups can be easily led astray if the chemistry of the relationships does not workout at an individual level of particular company representatives. Hence, there is a need to create the conditions that can sustain the long-term opportunity quests from the cluster companies, levelling up the field for new lead generation and opening up companies to a large pool of potential leads at once. This could be achieved by creating an open market of ideas for new products in new application areas, - involving in the information exchange all interested parties: technology providers, customers, end-users.

1.2 The perceived market need and opportunity

The medical device industry is a rapidly growing area providing opportunity for optics and photonics technology, with applications ranging from diagnostics to surgical tools to therapeutics. The main driver is the miniaturization of medical devices which require the electronic components with a smaller form-factor, a smaller energy footprint and a closer integration with the existing systems, including IT and communication networks. The main barrier for the take-up of the photonics in the medical sector has been a long development and regulatory approval cycle which made new product development a very

capital intensive process, creating a gap between the developed and validated prototypes and the production-ready devices.

Optics and photonics technologies are particularly well-suited for clinical use given their capacity for non-invasive diagnosis, therapy and treatment. Medical applications continue to expand from optical coherence tomography and imaging to optical fibres and lasers for surgery, and most recently the explosion in wearable devices. Photonics components have become key enablers in the design and development of next-generation medical devices and diagnostics. This trend has its roots in mature imaging technologies like optical microscopy and endoscopy/colonoscopy, which gained momentum with the recent rise of minimally invasive surgeries and molecular diagnostics. The photonics application market in health is poised to accelerate, through emerging applications such as optogenetics, laser ablation therapy, optical coherence tomography (OCT) and many others that have been identified as having a potential technological feasibility and a commercial interest (Annexes 1-2).

The global market for photonics in medical technology and life sciences is projected to nearly double during the current decade, increasing from approximately 49 billion EUR in 2011 to $98 billion EUR in 2020, according to the latest market research[1]. With new breakthroughs in genetics, stem cell therapy and new treatments the need for optical imaging, monitoring, and testing techniques will continue to grow.

1.3 Identified capability gaps

However, the more widespread use of optics and photonics technologies in medicine presents certain difficulties for medical device original equipment manufacturers (OEMs). Integration of these highly complex, high-precision components must be considered and managed carefully, all the way from the earliest design phases through to production. Industry experts have identified four areas where the mismatch between photonics components and medical systems occur most often[2]. These are as follows:

1. *Incomplete tolerance analysis.* Many medical device OEMs perform an incomplete tolerance analysis, failing to take into consideration all aspects of their designs. This is caused by the lack the photonics-related engineering background to fully understand all of the optical requirements and performance drivers for the needs of a particular system. Medical device manufacturers and system integrators often have an idea of what they are trying to achieve from a biologics standpoint but they are not well equipped to convert that concept into optical and mechanical requirements. Underspecifying optical tolerances can cause performance shortfalls or issues during final assembly, either of which will require expensive and time-consuming design rework, if the problem is not readily identified until after clinical trials have begun. Likewise, over-specifying optical tolerances can add unnecessary cost, complexity, and lead time to a product development process;
2. *Lack of capability for component testing.* Many medical OEMs do not have sufficient capability for

[1] Photonik Branchenreport 2015, Photonics Industry Report 2015: Current Situation 2015, http://www.photonics21.org/download/Brochures/Industry_Report_Current_Situation_2015_text.pdf
[2] D.Hill and K.McEuen, Zygo Corporation, 4 Big Mistakes in Developing Photonics-Enabled Medical Devices, http://www.zygo.com/library/papers/BigMistakesInDevelopingPhotonicsEnabledMedicalDevices.pdf

testing components in-house. Yet it is important for medical OEMs to have the capability to verify that the manufactured photonics components meet the stringent requirements that can impact performance, especially when the components have tight optical and mechanical tolerances. If the components are not verified before the system assembly, OEMs run the risk that the assembled parts will not achieve the alignment tolerances indicated by optical modelling.

3. *Adversary impact of transportation conditions.* It is crucial to give a very thorough consideration to the potential impact of transportation conditions on a sensitive, precision-aligned product. The consequences of poor packaging design and misaligned optics can be severe. OEMs should start consider the level of packaging that is required as soon as the opto-mechanical tolerances are understood and included in the technical requirement briefs. Once there is a clear understanding on how much movement will be allowed in the alignment tolerance budget, OEMs can determine how to constrain the optics and what level of packaging is required. The precision of the packaging design should be consistent with the capabilities of the system to offset shock and vibration during shipping.

4. *Supply chain management failure.* Supplier selection is another vital area of potential mismatch where manufacturers of photonic-enabled medical devices might not fully be able to appreciate the technological and manufacturing capabilities of individual high-tech photonics component suppliers. Many OEMs have experience handle supply chain management when it comes to mechanical or other components that are batch manufacturers, yet when it comes to customer-built photonics components there is an additional need to have an engineering knowledge to properly vet a supplier, particularly when it comes to optical components which can profoundly impact to the overall system performance such as, for example, laser sources, optical modules, specialty optics for ultrafast, high frequency laser systems.

These mismatched largely are impacted by the lack of knowledge and expertise on both sides: the developers of photonics and optic components lack an in-depth understanding of biological systems for which the applications of medical devices are being devised while medical OEMs lack engineering knowledge about of the optical and opto-mechanical parts and systems they source in.

1.4 What the Partnership can accomplish?

In order to address the identified mismatch between photonics suppliers and medical OEMs and open up a field for wider cooperation across different value chains the Partnership will adopt the following three-step approach in creating an opportunity:

1. Market needs will be gathered and made available to the medical OEMs and photonics companies through the organised missions and direct contacts with the counterparts in the targeted markets;

2. Proposed existing or novel product ideas matching the identified market needs will be facilitated involving experts from the interested companies through the moderated discussions over Internet;

3. Product ideas will be tested through the organised missions to the targeted markets, involving the clusters representing potential customers for the proposed products.

Product concept briefs (based on the identified early signals from the market and the technology offers from the potential companies within the Partnership) will be prepared and made available to the cluster organisations in the targeted companies. The product concept briefs will be validated by the experts in the field drawn from the identified list of experts from the cluster companies, universities and the research and technology organisations, involved in the Partnership-related cluster activities.

Through these combined technology-push and market-pull facilitation activities the Partnership will aim to:

1. Increase the revenues of cluster members in the export markets;
2. Increase their market share/access to new markets
3. Strengthen their position in the competitive landscape through sharing market knowledge;
4. Increase the margins by creating the conditions for economy of scale;
5. Decreasing a time-to-market for new products by facilitating the co-creation of new products with the involvement of OEMs and the end-users bridging the gap of expertise knowledge between research and business communities in photonics and medical devices.

2 Partnership performance

2.1 Key performance indicators

The following KPIs have been established for the duration of the ongoing project. The list of the targeted SMEs is provided in Annex 3.

Table 1: KIPs for LASER-GO

Title	Brief Description	Target (quantity)	Comments
P1	New clusters involved in the partnership by the end of the project	3	All three present members of the consortium have expressed their commitment to setup the Partnership by signing the Partnership Agreement on behalf of the participating cluster organisations. The Partnership Goal Statement will be used to consolidate the main building principles of the planned Partnership (see below).
P2	Number of cluster organisations and business networks from different COSME participating countries having benefited from the supported actions	3	
P3	Number of Partnership Agreements resulting from the supported actions	1	
P4	Number of events organized during the visits to third countries	3	It was agreed that each cluster organization will be responsible for organizing one event in conjunction with one of the planned visits overseas.
P5	Number of SMEs having directly or indirectly benefited from the supported actions, resulting in cooperation projects	90	Since the proposed list of 90 companies from three clusters (to be directly targeted through this action) includes a mix of SMEs and large companies, it was decided to create a sub-list of the directly targeted SMEs and additionally to create a list of SMEs which will benefit indirectly in order to meet this target number per consortium.
P6	Increase in the percentage of the turnover from international activities of the SMEs having benefited directly and indirectly from the supported actions, as measured through a survey by the end of the action	10%	To keep track of these indicators a survey of 90 SMEs will be conducted in Month 6 and Month 24 using two lists (as defined above): • Directly benefiting SMEs; • Indirectly benefiting SMEs. The survey will answer two questions: 1) What is an export share from the total revenue of the targeted companies? 2) What is the amount of funding attracted / spent on cooperation projects involving members of the partners in the Partnership, other international clusters and/or business partners?
P7	Number and volume (i.e. amount/funding) of resulting cooperation projects between the Partnerships and international cluster and business network partners for the benefit of European SMEs	6 projects with total budget for cluster SMEs and institutions of >5 MEUR	

2.2 The principles for operating the Partnership

The common understanding has been shared to work towards the establishment of the Strategic Partnership of Photonics for Health on the basis of the following principles:

1. Focusing on the application areas related to photonics-enabled technologies in health-related uses;
2. Establishing links with other clusters active in the areas which can increase the cross-sectorial scope of the present Partnership and open up access to new value chains: in mobility, smart cities, active and assisted living, giving preference to other COSME Go International clusters;
3. Leveraging political support in the respective regions while planning visits and activities overseas and aligning with the regional export strategies while selecting and finalizing the countries for those visits.

No preliminary limitations regarding the geographical location of potential new members will be implemented. No geographical limits will be imposed on the new clusters. The preference will be given to clusters which can contribute to the existing value chains covered by the constituent cluster partners. OV will act primarily as a go-between when accessing clusters in the French-speaking countries, HTS will act mainly as a proxy for accessing clusters in the German-speaking countries while LITEK will be responsible for identifying the potential candidates in the countries in Eastern and Central Europe

2.3 What we expect from each partner?

The Partnership is based on the basis of fair treatment of all partners as equal. Hence, it is expected that each partner will be equally rewarded for the commitment to:

- Making an effort to obtain a co-funding for the running of the Partnership-related activities;
- Gaining commitment from stakeholders and the public bodies;
- Maintaining visibility of one's involvement in the Partnership;
- Opening up to further collaboration in project-related activities;
- Showing trust in each other by sharing information and knowledge vital to the Partnership;
- Honouring the commitments and fulfilling them in a timely manner.

2.4 The commitment to establish the Partnership

The founding parties to the existing consortium have reiterated their commitment in setting up the Partnership at the end of the COSME project. To that end a charter with the European Commission was signed which confirmed that the parties subscribe to the following:

- To set-up a partnership agreement engaging the partners to develop common actions and setting out the modalities of cooperation between them;
- To develop a roadmap for implementation with a long-term cooperation agenda to foster the sustainability of the partnership;
- To provide information upon European Commission's request on the partnership activities and achievements;

- Developing and implementing a joint 'European' strategy for going international beyond Europe; and
- Striving to successfully support the internationalisation of our SME members towards specific third countries, and/or attracting strategic foreign direct investment and cooperation partners and/or securing critical imports, knowledge and technologies with a view to support growth, jobs and investment in Europe.