Project: FOTONIKA-LV

Unlocking and Boosting Research Potential for Photonics in Latvia - Towards Effective Integration in the European Research Area

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1. Scientific and/or technical quality, relevant to the topics addressed by the call

1.1. The Concept and objectives

The project follows the aims and objectives of the association FOTONIKA–LV, which has been established at the University of Latvia to lead the photonics sector in the country. The Association FOTONIKA–LV has a clear vision of its mission to nurture and develop sustained and growing research activities in photonics domain for Latvia and ERA. Association FOTONIKA-LV will also contribute directly to corporate responsibility practices and developments in the economy of Latvia and the Baltic countries. These objectives are illustrated in graphical mode in Figure 1. The concept and mission of the project is to unlock and to boost the potential of photonics in Latvia.

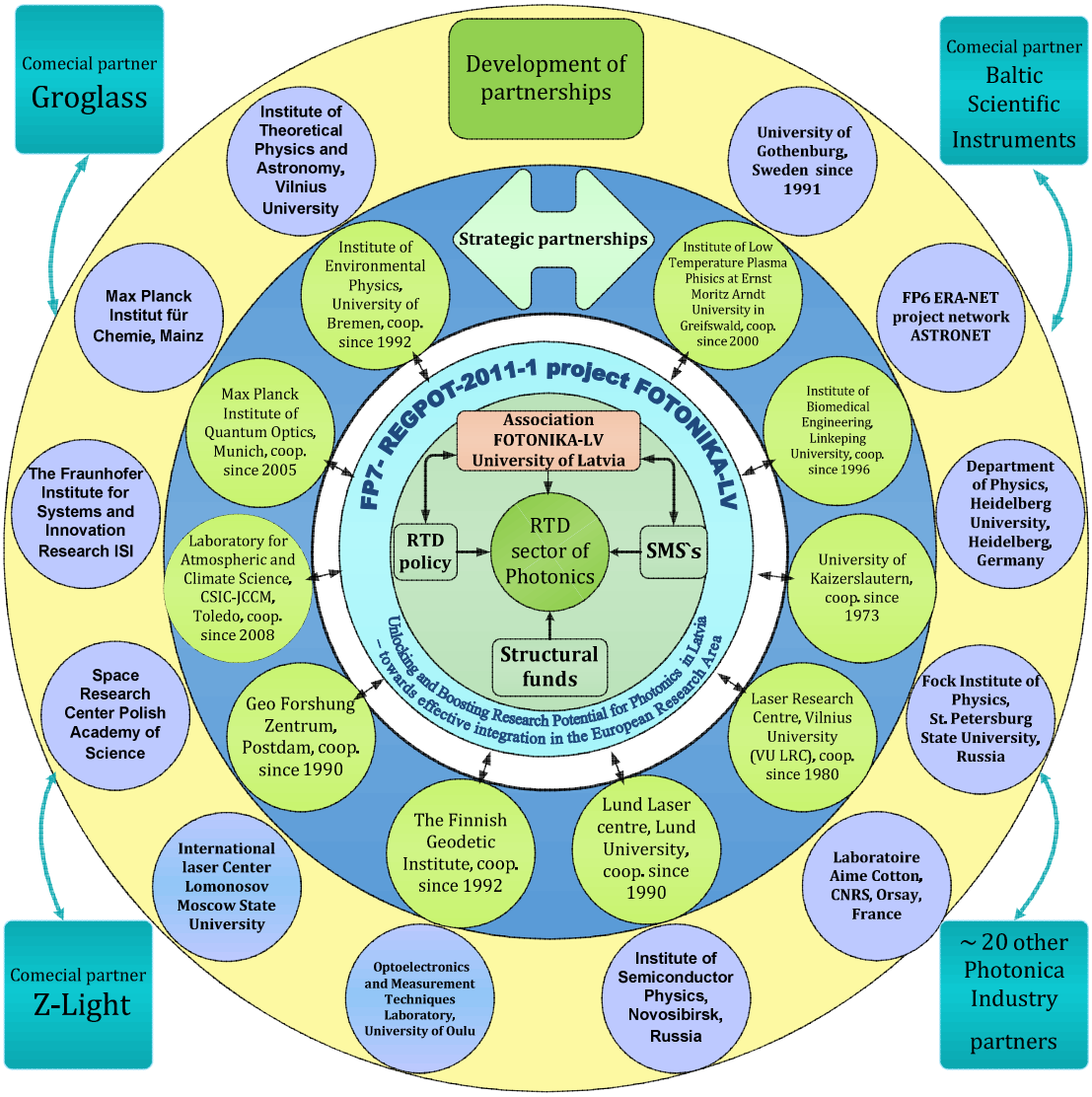

Figure 1. Graphical presentation of the concept and mission of FOTONIKA-LV as a Centre of Excellence, including the strategic partnerships at international level and linkage with RTD policy SMSs, and EU Structural funds at the National level and the role of FP7-REGPOT-2011-1 project in facilitation of substantial progress and long-term sustainability. Note that the project will facilitate also partnership with 10additional research centres in EU and beyond.

The main objective of the proposed centre of excellence is unlocking and boosting the national research potential towards innovation in the field of photonics.

The project ***provides necessary initial momentum and contributes to the corporate mission of FOTONIKA–LV*** at the University of Latvia - to intensify photonics activities in Latvia through deeper ERA activities in the photonics domain.

Enhanced development of photonics is regarded as one of the current national priorities, aimed at high added value industry, enabling discoveries into useful innovative applications, training future leaders of science and entrepreneurship in the field and, incubating companies for photonics technology.

It is expected that FOTONIKA – LV will have all means and potential to carry on its mission beyond the timeframe of the current proposal as the centre of innovation for photonics at both national and Baltic regional level, which also means a sustainable contribution to ERA. The new Cohesion policy linking together HORIZON 2020 calls like ERA chairs, Twinning and Teaming initiatives

All together that means a contribution to structural changes in Latvia's economy towards high added value high-tech industry. **It is the intention of the researchers making up the Association FOTONIKA – LV to face the challenge of consolidating and growing the photonics community in the country, enhancing its recognition at the political level, and developing the photonics research into a national R&D priority.** In order to achieve that, the association will propose reformulation of the national R&D strategy to include photonics as one of the key driving forces, and it will carry out activities aimed at regional mobilization of human resources and education of future leaders and workforce with competence in modern photonics.

Analyses of discussions, strategic planning process and SWOT exercises clearly identified major needs facing FOTONIKA-LV researcher's community, its institutes and their labs and departments and extreme efforts were made during the first 1,5 years of project implementation to response to them via:

- Further development of strategic partnerships and twinning ***with the leading European centers*** is necessary to maintain high standards of photonics research in Latvia and in neighboring
- Transnational two-way secondment of research staff with strategic partners inside the EU, for bilateral research visits and for hosting visiting researchers from outside the EU is very important for further progress in the rapidly emerging photonics domain*;*
- ***Substantially increased research capacity*** and human resources was reached by attracting and training young researchers (*20 are on their way to PhD degree and 14 promising MSc students are counted for future of FOTONIKA-LV*), and by the repatriation of recent "scientific emigrants" and recruitment of experienced scientists from other countries
- Update of ***research infrastructure and it's elements which were*** uncompleted and some were "locked without use" due to 1990-2005 - "starving years" of the Latvian Science and last 4 years "crises" financial cuttings.
- Strongly enhanced information dissemination activities in the domain of photonics, quantum sciences through various workshops on national and pan Baltic scale and the development of Riga Photonics Centre (*RPC*) which is supposed to ensure long-term influence for years after the project.
- Contribution of the Association FOTONIKA-LV to the consolidation and policy development in the field of photonics on both national and regional *(Baltic countries)* levels in order to support relevant and resource effective high added value industry production and accordingly to invest intellectually in regional sustainable development. The emergence of Latvian National Strategy Board for the domain of Photonics, Quantum Sciences and Technologies was promoted during the 1.5 years of the project.

Now the Board will be main player in bottom-up argumentation in favor to decision defining this domain as an area of smart specialization for Latvia and possibly for three Baltics states counting together remarkable capacity in basic research and in industry.

1.1.3. Objectives

In order to solve the identified problems, the following overall and specific **objectives** have been set up for this project.

The overall objective of the project is to contribute to the realization of the full research potential of the enlarged Union and vision of Innovative Union 2020 by unlocking the existing and developing the emerging potential of the Association FOTONIKA-LV at the University of Latvia in the fields of basic and applied photonics thus boosting the photonics research innovation and strengthening the of the RTD sector in Latvia.

The specific objectives are:

Objective 1: *Exchange of know-how and experience (WP1)*

- To perform transfer of knowledge in photonics related fields with the already established strategic partnerships with 10 **leading** EU research centers *(see list on cover page*) via scheduled two-way secondments and research training *(lectures, tutoring, and hands-on work of young researchers on the upgraded research infrastructure)*;
- To extend the magnitude of cooperation with other research centres in the EU and beyond by further developing a number of already existing collaborations and starting new partnerships with :
  - Institute of Theoretical Physics and Astronomy, Vilnius University, Vilnius, Lithuania;
  - Max Planck Institut für Chemie, Mainz, Germany;
  - The Fraunhofer Institute for Systems and Innovation Research ISI, Germany;
  - Space Research Center Polish Academy of Science, Poland;
  - International laser Center Lomonosov Moscow State University, Moscow, Russia;
  - University of Oulu, Optoelectronics and Measurement Techniques Laboratory;
  - Institute of Semiconductor Physics, Novosibirsk, Russia;
  - Laboratoire Aime Cotton, CNRS, Orsay, France;
  - Fock Institute of Physics, St. Petersburg State University, Russia;
  - Department of Phyiscs, Heidelberg University, Heidelberg, Germany.

Objective 2: *Recruitment of experienced researchers (WP2)*

This objective aims' at strengthening photonics research capacity and promotion of transfer of knowledge via:

- repatriation of 6 highly qualified Latvian researchers *(Dr.Hab.Phys Uldis Berzins from Sweden, laureates of Marie-Curie fellowship grants Dr.Aigars Ekers and Dr.Janis Alnis from Germany, Dr. Janis Pukite and Dr.Dimitry Docenko from Germany, radio physicists and engineer Janis Blahins from Israel)* ***key persons for future of FOTONIKA-LV****, These scientists used to be associated with the institutes forming the association FOTONIKA-LV and they emigrated seeking for better opportunities of research and training in the old EU countries;*
- Recruitment of 4 experienced researchers from abroad ***(****Dr.Hab. Annette Ladstätter-Weißenmayer, from Germany for 3 years. Dr.Nikolay Bezyglov, from Russia, for 3 years and Dr. Cristina Andreeva from Bulgaria for 3 years. Dr. Roman Viter from Ukraina for 1 year);*
- repatriation or recruitment of 4 on the basis of open competition for announced positions;

As a lateral benefit, which is not directly a part of a WP related objective, we aim at exploiting the increased intellectual and technical capacity of FOTONIKA-LV for providing substantially improved research and training environment, thus attracting more students at all levels, especially young researchers who are winners of grants provided by the European structure funds.

Objective 3: –*Upgrade of experimental infrastructure (WP3).*

This objective aims at replacement of outdated equipment with the new generation devices, as well as creation of new technical capacities:

- Upgrading of 7 already existing experimental setups to bring them to an up to date level of technology;
- Development of 4 unique technologies:
  - laser& white light beam satellite ranging telescope for atmosphere night time remote sensing;
  - femtosecond laser spectroscopy;
  - laser spectroscopy in UV and VUV;
  - zeniths telescope.
- Development of new member of FOTONIKA-LV community of labs and departments - Molecular Beam Laboratory at LU ASI;
- Upgrade of Optics and Mechanics department design resources with professional machinery and optics design programmes;
- Two upgrades to have technological capacity for innovative findings:
  - Advanced upgrade of electron-beam and resistive evaporation of dielectric, semiconductor and metal multilayer achromatic optical coating installation - VU-2M for interference mirrors and filters etc. *(250-1100 nm)* – expected significant demand for advancements of photonics related experimental setups for basic and applied research and high-tech oriented SMEs in photonics sectors;
  - Upgrade of quartz and glass blowing and technology workshop& laboratory capacity towards UV and VUV technologies and usage of RF plasma in technology processes.
- Upgrade of the laboratory of returning researcher Dr. Ekers with new coherent light sources and optics for accurate atom and molecule laser manipulation experiments, and upgrade of vacuum system for laser cooling of atoms. At the moment the existing laboratory infrastructure of Dr. Ekers is hibernating.

Objective 4: *Knowledge Transfer and Training: Organization of Workshops, Conferences and Research Training Courses. Contribution to policy development (WP4 and WP6)*

This objective aims at enhancing the transfer of knowledge content, achievement of recognition of photonics in the society and at the political level, and positive effects on training of young scientists.

- Contribution to the transfer of knowledge in photonics at national and international levels, recognition, publicity and appearance of the association FOTONIKA–LV at the University of Latvia in the European Research Area by:
  - Organization of 3 annual international conferences on photonics, linked exhibitions for SMEs from photonics domain and Research Training Courses. **All the Research Training Courses mentioned in the project will be addressed only to early or senior researchers, including PhD students**;
  - Contribution to the policy development at national, regional, and EU level towards resource efficient production with high added value and intellectual investment in sustainable development and its technology aspects via organization of the large scale international conference on “Sustainable development, Knowledge society and smart future manufacturing”;
  - Contribution to policy development by conducting 3 strategy planning workshops including technology foresight exercises for national and regional scale developments in photonics fields resulting roadmaps policy advice documents for decision makers, governments and National Photonics Strategy Group.

- Dissemination of research results by reporting at international conferences and brokerage events (*at least 18*), as well as scientific publications and seminars at the institutions of European and international partners.

Objective 5: ***Dissemination, promotion, contribution to innovation - Public access Riga Photonics Centre (WP5)***

- Establishment of the public-access ***Riga Photonics Centre*** in downtown of Riga for public access as a national and regional office for communication with society and advertising science, transfer of knowledge, innovation, and promotion of support to national high-tech industry.

Objective 6: ***Ex-post Evaluation of research potential of FOTONIKA-LV (WP7)***

This objective aims at evaluation of the potential achieved by the association FOTONIKA-LV during the 3 years of the project, including a new SWOT analytics and update of the Association's strategy and tactics according to the current political and economical situation. In particular, the Ex-post evaluation will consider the following indicators:

- Success of the overall implementation of workplan of the Project;
- Level of human potential in photonics compared to pre-project time;
- Success in upgrading of R&D infrastructure and coherence of these upgrades with other infrastructure investments via EU Structural Fund; the main criterion will be the long-term capacity for state-of-the-art research;
- Created synergies with other photonics R&D and innovation activities in Europe and achieved level of capacity for international cooperation;
- Contribution to applied research in photonics domain and developed cooperation with SMEs;
- Progress of national scale science strategy and policy development, standing in ERA, and long-term sustainability of this project's investments.

1.2. Quality and effectiveness of the support mechanisms, and associated work plan

The work plan of the project includes a set of support measures aimed at implementation of the overall long-term strategy and achievement the specific goals and objectives of the project FOTONIKA-LV; the content of the work packages was organized accordingly and is coherent with the activities supported by the REGPOT-2011-1 Call.

The work plan is structured seven ***work packages and the first 6 has tasks related to the first iterim reporting period:***

Partnerships, exchange of know-how and experience, – WP1,
WP leader: Sandra Smalina;

Repatriation and recruitment of experienced researchers, - WP2,
WP leader: Kalvis Salmins;

Upgrading, development or acquisition of research equipment, - WP3,
WP leader: Edgars Smalins;

Knowledge Transfer and Research Training: Organization of Conferences, Courses and Workshops, - WP4,
WP leader: Dina Berzina;

Dissemination, promotion, contribution to innovation-Public access Riga Photonics Centre, - WP5,
WP leader: Janis Klavins (retired and is changed by Ojars Balcers),
assistant Natalija Lesina

Policy development, Management and Quality Assessment, - WP6,
WP leader: Sandra Smalina;

Ex-post Evaluation of FOTONIKA-LV research potential, - WP7,
WP leader: Arnolds Ubelis.

Five of 7 work packages relate to the corresponding five main topics of WP of FP7-REGPOT–2011-1 call and relevant specific objectives for the project FOTONIKA-LV. WP 6 is crosscutting and covers overall policy development, management and quality assurance. The last one, WP7, will be implemented when the project's main activities are finished and following to FP7REGPOT-2011-1 Work Programme should cover ***Ex-post Evaluation of FOTONIKA-LV research potential*** during the 6 months after the 36 months implementation period of the Project.

1.3. Summary of implementation of Work Packages tasks and project management issues.

Each WP has several tasks to be fulfilled: **WP1 – 3; WP2 - 11; WP3 – 11; WP4 – 6; WP5 - 4; WP6 - 6, WP7 -1**.

During the first 18 months the following tasks of defined work packages are fully implemented or are in ongoing stage:

WP1 – 3 - all three tasks are in good progress and statistically fulfilled**;**

WP2 – 11 – tasks 2.1, 2.2, 2.3, 2.6, 2.8, 2.9. 2.10. 2.11, that means 8 from 11 are implemented;

WP3 – 11 - tasks 3.2, 3.3, 3.4, 3.5, 3,6, 3,7. 3,8. 3.11, that means 8 from 11 are Implemented;

WP4 – 6 - tasks 4.2, 4.3, 4.5, are already implemented. Tasks 4.1. 4.4, 4.6 4.5, are in the process of implementation accordingly;

WP5 – 4 - Tasks 5.1 is implemented. Tasks 5.2, 5.3, 5.4 in the process of implementation accordingly;

WP6 – 6 - all six tasks are in in the process of implementation accordingly;

WP7 - 1. - Task 7.1. Scheduled to year 2015.

Work package leaders are experienced in the type of activity covered by their WP, gender balance is kept within the team and the project management team has cooperative spirit and service mentality towards researcher's community of Association FOTONIKA-LV. Each WP leader is responsible for monitoring implementation of the tasks according to the schedule specified in 1.2.4, reporting to the Management Board and implementing its decisions. Global management of the project is done by the project Management Board headed by the Coordinator. MB includes leaders of the 4 laboratories and 5 departments of institutes forming the Association FOTONIKA-LV and repatriated and recruited researchers are also involved in decision making process.

The Project Scientific Steering Committee is directly linking the project team with strategic partnership institutions nationally and internationally. SSC, support and advise on current problems of project implementation, simultaneously dealing with long-term sustainability of project initiatives and is promoting strategy and policy developments on an ERA scale. The intensity of involvement and interests of delegates from various research institutes strongly depends on the level of collaboration. For example Prof.Dag Hanstorp from University of Gothenburg was invited to become a member because of very favorable development of cooperation between Association FOTONIKA-LV and Department of Physics at the University of Gothenburg.

The following approach was defined in the project proposal and is strongly sustained by the project Coordinator and management team:

a) Part-time work for researchers involved in the project FOTONIKA-LV is planned for the whole project period and planned workload *(person/months)* will be distributed across project run period according to the actual needs defined in the WP and crosscutting activity.

b) Special attention will be given to teambuilding, and organizational productivity, through the introduction of a flat organizational structure, involving a wide range of experts reporting through a thin layer of management to a small administration. Small group reporting functions will be introduced to consolidate and mobilize the enlarged and diverse team of experienced and young researchers, technicians, repatriated researchers, researchers seconded from abroad and students. Simplified reporting functions will be introduced to facilitate academic freedom and creative thinking, and to decrease human resources overload and duplication of work processes;

d) All laboratories and research groups from the three research institutes forming the Association FOTONIKA-LV at the University of Latvia will participate, contributing to the success of the project and benefiting from the implementation of the workplan;

e) During the strategic planning seminars, SWOT analysis exercises and risk assessments *(See Annex 1)* it was agreed that the ***loyalty and commitment*** of every person of photonics researchers community is needed to fulfill the mission and to ensure long-term sustainability of **FOTONIKA-LV** initiatives;

g) To facilitate effective management coordination, and to save time and resources, knowledge management and quality assurance processes of the project will be made in virtual space through the project portal: *www.asi.fotonika.lv*.

1.4. Timing of the project implementation and the table of, WPs showing main outcomes of implementation of their tasks during the first 18 months

The implementation of the project has been divided in four chronological phases for the implementation of the project, followed by an evaluation phase:

A) Pre-Project Phase. In order to establish the internal legal base, to save project time and resources and to launch the project effectively, the Project team was active during 5 month ***pre-project*** *period starting from September 2011 (when contract negotiations are already in final phase).* Colloquiums of FOTONIKA-LV dedicated to the project started even earlier **in spring 2011 and contributed to the publicity of Association of FOTONIKA-LV as a bottom-up initiative of integration of research teams and research institutes in larger units targeting towards Photonics as a Key Enabling Technology in ES.** University administration was active only during the last two month of the pre-***project*** *period.*

In pre-project phase was done the following:

- Several FOTONIKA-LV colloquiums, workshops and meetings where raised to increase the awareness about project inside the FOTONIKA-LV community and awareness of society and Latvian authorities about selection process of Key Enabling technologies in EU;
- Discussions where raised with the University administration, Government structures and Saeima members about strengthening of legal status of the Association FOTONIKA-LV in order in increase the speed of decision making process and decrease of bureaucracy load of traditionally conservative university management not adopted and not experienced to the management of such large EU framework projects;
- Other aspect and need for mentioned changes were related to expected applied research activities and eventual contracts with large industry – where fast, professional and transparent decision making process is needed;
- Unfortunately the project team and leadership of their research institutes of the Association failed to receive understanding from the University and Government side and were left alone. This failure put extra burden and waste of time and administrative resources during the implementation of the project and led to strong overload of the Coordinator, management team and the research units as well. The boosting of research potential of the whole FOTONIKA-LV team was reached via it's self-sacrificing efforts without any merits from the University administration and the Government in spite of the fact that this REGPOT projects during the 42 months will contribute directly to Latvian state budget via various taxes the sum close to 1 m€. The indirect contribution and increased activities in the photonics domain will bring much more;
- *P*reparation and release of the corresponding University internal decrees and opening the project account *(when contract is signed)* where mostly done in the last two months of per-project phase;
    - Preparation of contract templates for repatriated and recruited researchers and Executive Team members;
    - Update of schedules for recruitments/repatriation, outgoing and incoming secondments;
    - Preparation of specifications for purchase procedures in the context of infrastructure upgrades;
    - Preparation for the kick-off meeting and the first meetings of Management and Scientific Steering Committee;
    - Sending announcements on the first scheduled conferences, Research Training Courses. and workshops;
    - Preparation of articles and press releases about commencement of the FOTONIKA-LV project.

B) During the kick-off phase (*the first months*) the following activities were made:

- The working environment in the labs, departments, and observatories of FOTONIKA-LV was adapted to the needs of repatriated, recruited researchers and for the first secondees as well. Efforts to attract more students, young researchers and other professionals were made. technicians accent on students a;
- Several Colloquia of FOTONIKA=LV were raised like Kick-off events for the specific tasks in Work Packages;
- Press relies were raised, various media and MPs were informed about start phase of the project;
- Road man of activities for the year 2012 were specifically corrected including plans for new FP7 project development for the sustainability of the project keeping in mind further decreases of Latvia RTD budget support..
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C) During the Implementation working phase of the first ***18 months activities of all work packages, were run in parallel.*** Besides WP 5&6 were contributed efficiently to the success of each WP and to the entire project as such. WP7 has time schedule 37-42 months;

The timing of planned work packages, their separate tasks and short reporting (in addition to WP deliverable reports) done **is given in the Table 1.2a** and in the Gant chart.

Table 1. *Work packages, their tasks and high-lights of outcomes on their implementation during the first 18.month. The details are reported in Deliverables reports for each WP*

WP No	Task No	Work package title	Lead partic. Short Name	P//M	START M.	END M
WP1		***Exchange of know-how and experience***	FOTONIKA-LV	58	1	36
	Task 1.1	**To organise 35 two-way secondments** between FOTONIKA-LV researchers community at the University and strategic partners in the EU.			1	36
Reporting WP1, Task 1.1 – first interim report.					1	18

In total 29 two-way secondments (p/m = 15,2) between FOTONIKA-LV researchers community and strategic partners in the EU including:

To FOTONIKA-LV from strategic partners - .11 secondment visits (p/m = 1,8)

From FOTONIKA-LV to strategic partners - 18 secondment visits (p/m = 13,4)

	Task 1.2	**To organise 17 two-way secondments** between FOTONIKA-LV researchers community at the University and foreseen or emerging partnerships in the EU and beyond.			1	36
Reporting WP1, Task 1.2 – first interim report.					1	18
In total 24 two-way secondment visits(p/m = 21,7) between FOTONIKA-LV researchers community and and foreseen or emerging partnerships in the EU and beyond **To FOTONIKA-LV from partners - 9 secondment visits (p/m = 9,2)** **From FOTONIKA-LV to partners - 15 secondment visits (p/m = 12,5)**						
	Task 1.3	Planning of partnerships and exchanges, **self assessment and internal quality control.**			1	36
Reporting WP1, Task 1.3 – first interim report.					1	18
Reporting in Colloquiums of FOTONIKA-LV , weekly seminars in relevant associated institutes, seminars in labs or departments were persistently used for planning of partnerships and exchanges, self assessment and internal quality control.						
WP 2		***Repatriation and recruitment of experienced researchers***	LU FOTONIKA-LV	393+18	1	36
	Task 2.1	**Repatriation of experienced researcher - Dr.hab.Uldis Berzins**, Sweden, *(trained at the LU ASI).*	LU FOTONIKA-LV		1	36
Reporting WP 2, Task 2.1 – first interim report.				18	1	18
Dr.Hab.Uldis Berzins was repatriated to Latvia and contracted in the project from February 1, 2012. Besides direct and intensive scientific activities he worked on and initiated one project proposals to FP7 calls, one project proposal to Latvian Science Council Call and one project proposal for bilateral cooperation between University of Freiburg and FOTONIKA-LV: 1) Dr.h.Uldis Berziņš. Coordinator Spectroscopy of Ions Using Lasers and Synchrotron Radiation – a Global Scale Community. IONS SPECTRA, FP7-PEOPLES-IRSES-2013,Nr 612582 for duration 2013-2017. In consortium Universities from Gothenburg, Stockholm, St.Petersburg and Mexico City, Bercely labs in USA and research institute from Belarus. The project failed to be retained for financing and will be resubmitted to HORIZON-2020 calls in December 2013 2) Dr.Hab. Uldis Bērziņš&Dr.Dag Hanstorp. Experimental Studies of Negative Ions: Design of Mobile Apparatus and Experiments Using various Radiation Sources (2013-2016). The project submitted to Latvian Research Council call (received excellent international peer evaluation 79 points from 90) but was not retained for financing for extremely small national financing for this call. Will be resubmitted for the call in 2014. 3) 3) .Hab. Uldis Bērziņš."Experimental research dedicated to interactions of negative ions with femtosecond laser light beams", bilateral cooperation – July - September 2013, financed by Baltisch-Deutsches HOCHSCHULKONTOR .					
	Task 2.2	**Repatriation of experienced researcher Dr.Aigars Ekers,** European Science Foundation, France *(trained at the LU ASI).*	LU FOTONIKA-LV		1	36
Reporting WP 2, Task 2.2 – first interim report.				18	1	18

Dr.Aigars Ekers was repatriated to Latvia and contracted in the project from February 1, 2012. Besides direct and intensive scientific activities he worked hard to promote national scale understanding on Key Enabling Technologies and the need for smart specialization in Photonics, Quantum Sciences and Technologies. He is a Latvian delegate to Programme Committee for ERC, PEOPLES and FET for HORIZON 2020. He was elected as a new director of the Institute of Atomic Physics and Spectroscopy. He raised project proposal to Latvian Science Council Call and was coordinator for two Marie-Curie fellowship project proposals. 1) Aigars Ekers. Control of ionizing Rubidium atom-diatom reactions in the ultra-cold regime. (2013-2016). The project submitted to Latvian Research Council call (received excellent international peer evaluation 84 points from 90) but was not retained for financing for extremely small national financing for this call. Will be submitted to call in 2014.						
	Task 2.3	**Repatriation of experienced researcher Dr.Jānis Alnis,** Germany *(trained at the LU ASI).*	LU FOTONIKA-LV		7	36
Reporting WP 2, Task 2.3 – first iterim report.				1,6	1	18
Dr.Janis Alnis was repatriated to Latvia and contracted in the project from April 1, 2013. Besides direct and intensive scientific activities he already before repatriation worked hard on new project development and assisted in raising 2 FP7 projects and one project proposal to Latvian Science Council Call 1) Dr.Janis Alnis. **Coordinator.** Reaching new limits of accuracy for distance measurements in satellite ranging by using technology of femtosecond frequency combs. **FEMTO-SAT, 313027**, SPA.2012.2.2-01. In consortium research institutes from Germany, Czeh republic, South Corea. The project failed to be retained for financing and will be resubmitted to HORIZON-2020 eventual calls accordingly. 1) Dr.Māris Ābele. **Coodinator**. Dr.Janis Alnis Towards New Performance of Distance Measurements in Satellite Laser Ranging – Advancement of Technologies Contributing to the Earth Sciences, In consortium research institutes from Germany, Czeh republic, Russia, Ukraine, South Corea. The project failed to be retained for financing and will be resubmitted to HORIZON-2020 calls in December 2013 2) Dr.Jānis Alnis&Dr.Māris Ābele. Advances in Satellite Ranging Science and Technologies, Earth Geodynamics and Breakthrough in Active Remote Sensing of Nocturnal Atmosphere (2013-2016). The project submitted to Latvian Research Council call (received excellent international peer evaluation 80 points from 90) but was not retained for financing for extremely small national financing for this call. Will be submitted to call in 2014.						
	Task 2.4	**Repatriation of experienced researcher Dr.Janis Pukite,** Germany *(trained at the LU ASI).*	LU FOTONIKA-LV		25	36
Reporting WP 2, Task 2.4– first interim report.				0		
Repatriation of Dr. Janis Puķite is scheduled to year 2014						
	Task 2.5	**Repatriation of experienced researcher Dr.Dimitrijs Docenko,** Germany *(trained at the LU AI).*	LU FOTONIKA-LV		1	36
Reporting WP 2, Task 2.5– first interim report.				0	1	18
Repatriation of Dr.Dimitrijs Docenko is postphone till ye\ar 2014. The need for workforce was satisfied via recruiting in open competition via EURAXEC portal two colleagues from Lithuania						
	Task 2.6	**Repatriation of highly skilled and experienced technician** - MsC Optoelectronics **Janis Blahins Israel,** *(worked in the LU ASI).*	LU FOTONIKA-LV		1	36

Reporting WP 2, Task 2.6 – first interim report.				18	1	18
Highly skilled and experienced technician - MsC Optoelectronics **Janis Blahins** was repatriated from Israel and contracted to the project in February 1, 2012. Besides research plans foreseen in this task in the project proposal he was extremely productive in raising one commercially perspective collaboration with BSI LTD and is intensively involved in cooperation with Gothenburg University colleagues to build mobile ion beam device GRIBA and has a perspective to defend his PhD thesis.						
	Task 2.7	**3 year recruitment of incoming experienced researcher from Bremen, Priv.-Doz. Dr. Annette Ladstätter-Weißenmayer,** Germany.	LU FOTONIKA-LV	0	1	36
Reporting WP 2, Task 2.7 – first interim report.				0	1	18
The was agreement with Priv.-Doz. Dr. Annette Ladstätter-Weißenmayer and 2 attempts for her recruitment in Riga (Application for M-C fellowship, Latvian national Struscture Funds project) to go ahead with active remote sensing in nighttime atmosphere and MAxDOAS satellite validation station. anstarted to preparation to be recruited already in pre-project phase via visit to Riga and discussed various problems related to her move to Riga with her family, as well as specified tasks she will prepared to solve at the very beginning of the project. But simultaneously she received very attractive long-term offer in her home university and decided no to lose opportunity.. This was unfortunate outcome for the project. The problem was partly solved via success with the project: FP7-PEOPLES- IRSES, Grant Nr. 294949, NOCTURNAL ATMOSPHERE, Secondary photochemical reactions and technologies for active remote sensing of nocturnal atmosphere (2013-2016) where Bremen University and Priv.-Doz. Dr. Annette Ladstätter-Weißenmayer are part of the consortium. Therefore links and involvement of Annette are saved. Dr.Maris Abele, being highly professional in the field was specifically recruited for 9,4 months in order to keep things running in the building of white light beam laser telescope for active nighttime remote sensing of atmosphere.						
	Task 2.8	**1 year recruitment of incoming experienced researcher,Dr. Roman Viter,** Ukraine**.**	LU FOTONIKA-LV	5	7	18
Reporting WP 2, Task 2.8 – first interim report.				5	1	18
Recruitment of incoming experienced researcher,Dr. Roman Viter, Ukraine resulted in very effective outcomes for the project. Besides very succesfull involvement in research activities he contributed a lot in writing retained for financing project: FP7-PEOPLES-IRSES *BIOSENSORS-AGRICULT. Nr.316177 - DEVELOPMENT OF NANOTECHNOLOGY BASED BIOSENSORS FOR AGRICULTURE".* Besides he was involved in writing few more FP7 project proposals up to now not reatined for finnacing but possibly will be succesfull after rresubmition to relevant HORIZON-2020 calls.						
	Task 2.9	**3 year recruitment of incoming experienced researcher Dr. Nikolay Bezuglov,** Russia	LU FOTONIKA-LV	14	1	36
	Task 2.10	**3 year recruitment of incoming experienced researcher Dr. Christina Andreeva-Markovska,** Bulgaria**.**	LU FOTONIKA-LV	9	1	36
Reporting WP 2, Tasks 2.9&2.10– first interim report.				23	1	18

Recruitment of incoming experienced researcher Dr. Nikolay Bezuglov from Russia and Dr. Christina Andreeva-Markovska form Bulgaria was foreseen in project plans in connection with repatriation of Dr.Aigars Ekers. Thanks to that he was able to boost the activities of his molecular beam group in full capacity, restore visibility in European Research Area and to write several publications to peer reviewed journals about outcomes of theoretical and experimental research.						
	Task 2.11	**Repatriation or recruitment of 4 - 5 experienced researchers in the field of photonics selected and recruited in open competition during the first year of the Project run.**	LU FOTONIKA-LV	PM	3	36
		Justas Ždavnavičus		12,1		
		V.Laugalys		1		
Recruitment of incoming experienced researchers Dr.Justas Zdanavicus and Dr.Vidmantas Laugalys from Lithuania contributed a lot to raise human capacity of Astronomy Observatory and they were substituting dr. Docenko, who failed to be repatriated wit the start of the project.						
		Georgy Aspar Markovski		5		
		Teodeora Kirova		7		
Recruitment of incoming experienced researchers Dr.Georgy Aspar Markowski and Dr. Teodora Kirova, who were participants in early projects raised by Dr.Aigars Ekers was successful opportunity for Aigars Ekers to use previous experience of those two colleagues in the field of molecular beam physics in boosting up scientific productivity of his group. .						
		Jorge Del Pino		3,3		
Recruitment of incoming experienced researcher Jorge DelPino from Cuba was crucial in sustaining human capacity and observation capability of Geodynamic observatory at the Institute of Astronomy of Association FOTONIKA-LV. The leaded of this Observatory died and the observatory faced serious problems and was failing to sustain it's duties of regular observations in international network of Geodynamic observatories. Besides Jorge is bringing new international experience from his work in the laboratories in Czech Republic and in Geoforshung Centrum Potsdam in Germany and the capacity and international recognition of Geodynamic Observatory is boosted substantially..						
		Veispāls Āris		1,16		
		Viesturs Silamiķelis		1		
Short-term recruitment of experienced technicians was needed to boost commercial activities with high tech SMEs – Baltic Scientific Instruments LTD. There are serious future project plans where team of FOTONIKA-LV and these SMEs will raise two commercial initiatives to be competitive in specific field of sensors of ionizing radiation.						
		Dr. Greg MC Donalds		1		
Short-term recruitment of Dr. Greg MC Donalds was caused by the need to have native English speaking professional in editing of language of project proposals for FP7 calls.						

WP 3		***Upgrading, development or acquisition of research equipment***	1	LU FOTONIKA-LV	6,0	1	36
	Task 3.1	Equipment to develop lab made working model **device for Night-Time Cartography of Atmosphere** by Exposing Satellite Instruments with a White Light Beam from the Earth's Surface.	1			1	24
The purchase of equipment is foreseen at the end of the second project Year							

	Task 3.2	**Development of satellite laser ranging systems** towards application of Femtosecond lasers and Frequency Combs.	1			1	24

Leading scientist	Janis Alnis
Laboratory Upgraded	Institute of Atomic Physics and Spectroscopy Association FOTONIKA-LV, University of Latvia
Equipment Purchased	There are purchased the following equipment" 1. Laser stabilization resonator; 2. Frequency comb
Justification for the purchase of equipment	This equipment was planned to purchase in the project to fulfill the tasks of lead scientists Janis Alnis, recruited in WP2.
Progress toward task implementation	Laser stabilization resonator arrived at the end of July and is set up. Frequency comb will arrived in the middle of August and will be set up in September.
Scientific results	An application is received for a 2 PhD student position. There is planned preparation of poster at Biofotonika 2013 conference in Riga (August 2013).

	Task 3.3	Up to date upgrade of equipment in the **Molecular Beam Laboratory.**	1			1	36

Lead scientist	Dr. Aigars Ekers
Laboratory Upgraded	Molecular Beam Laboratory of the Laser Centre Institute of Atomic Physics and Spectroscopy Association FOTONIKA-LV, University of Latvia
Equipment Purchased	The key components of the purchased tunable single frequency laser system with frequency doubling included **1) Coherent Verdi - G18 CW, Single-Frequency *(532 nm)* Laser** Properties: solid state single frequency cw radiation source at 532 nm with power up to 18 W, low noise level and built-in cooling contour; **2) Coherent MBR -110 Ring Laser** Properties: actively stabilised single frequency laser with monolith ring resonator, tuning range700-1100 nm, experimentally tested single-frequency peak power of 6 W and 18 W pump power; **3) Coherent MBD - 200 Frequency doubler** Properties: frequency doubling of laser radiation compatible with the MBR-110 output, with experimentally tested frequency conversion efficiencies of up to 15%; **4) Supplementary optics and devices** Properties: the supplement included options for laser wavelength measurement, mode structure monitoring, beam shaping and fibre coupling optics and controllers; a full set of optics for MBR -110 laser and optics and crystal sets for MBD-200 frequency doubler covering the entire lasing range of Ti:Sa

Justification for the purchase of equipment	Resolution of laser dressed states in the Autler-Townes spectra upon laser coupling of hyperfine level systems require a high stability of laser frequency and large Rabi frequencies of the respective quantum transitions. The laser system upgrade undertaken within this task included replacement of an outdated system of Ar+ ion laser pumped Coherent CR-699-21 dye laser by a new generation tunable Ti:Sa solid-state pumped laser system with frequency doubling option, which has far superior characteristics in terms of stability and power of output radiation. The upgrade package included also a laser wavemeter allowing a continuous and accurate monitoring of laser wavelength, a Fabri-Perot interferometer for laser mode structure monitoring, and an accurate adjustable single-mode polarization-maintaining fibre coupler system that enables efficient delivery of laser radiation to the experiment. The laser wavelength and mode structure monitoring, as well as accurate laser radiation delivery and polarization control enable a substantially higher accuracy experiments than what was possible with the old system. Of particular importance is the possibility to achieve substantially higher Rabi frequencies. In addition, the new laser system is substantially more energy- and resource- efficient, consuming by more than an order of magnitude less electrical power than the old system, thus complying with environment-friendliness policy of the laboratory.
Progress toward task implementation	The laser system including optical components and fibre couplers have been installed in the laboratory, fundamental Ti:Sa laser radiation of up to 6W in single frequency and second harmonic radiation of op to 500mW are available for experiments. Some minor technical problems related to replacement of not well suited optical diode isolating the Ti:Sa laser from back reflections from the frequency doubler optics and from the fibre coupler, as well as incompatibility of the supplied beam collimator with the output beam size are being solved with the supplier. Currently, a new experiment is being set up for observation of dark state formation upon strong coupling of hyperfine levels in the Na 3p and 3d states of Na at 819 nm.
Scientific results	The first test experiments with strong coupling between the 3 s and 3p states of Na and probing between 3p and 7d states have revealed oscillatory structures in the 7d excitation spectra. The theoretical analysis revealed that, given the available single frequency laser power of several watts at the 819 nm with the new laser system corresponding to coupling of 3p and 3d states, the coupling scheme with probe on 2s-3p and laser-dressing on 3p-3d should enable the resolution of laser dressed states formed upon coupling of individual hyperfine sublevels. Such experiment is being set up with the new laser system.

	Task 3.4	**Upgrade of UV and vacuum UV, spectroscopy instrumentation, and linked quartz&glaas blowing workshop and technology laboratory and development of far UV laser spectroscopy.**		1			1	18

Lead scientist	Dr. A.Ubelis, Uldis Gross
Laboratory Upgraded	Institute of Atomic Physics and Spectroscopy, Latvian University
Equipment Purchased	There are purchased Parts for a vacuum spectrometer Mc Person 234/302 1. 8302-0190-0, Grating Holder 3gab. 2. 355-107853-1, 1200 G/mm concave corrected grating 1 gab. 3. 355-107855-1, 600 G/mm concave corrected grating 1 gab. 4. 355-107856-1, 300 G/mm concave corrected grating 1 gab.

Justification for the purchase of equipment	Spectrometer can record spectra in the range from 37nm -151nm at the same time, which allows performing complex and effective research of UV sources and respective radio frequency excitement generators.
Progress toward task implementation	Procurement procedure is finished and supply of equipment is expected in September
Scientific results	UV radiation source and radio frequency excitement generator research.

	Task 3.5	**Upgrade of biophotonics research facilities.**		1			1	12

Lead scientist	Dr. Janis Spigulis; Edgars Kviesis-Kipge
Laboratory Upgraded	Institute of Atomic Physics and Spectroscopy, Biophotonics Laboratory, Association FOTONIKA LV, Latvian University
Equipment Purchased	MSO4054B - Mixed signal oscillograph
Amount spent	9541,09 Ls (13575,748 EUR) [0.702804]
Justification for the purchase of equipment	Mixed signal oscillograph was purchased to facilitate the electronics product development and testing.
Progress toward task implementation	Oscillograph is actively used for the development of electronic devices.
Scientific results	Oscillograph is a measurement device that is used in electronics product development. With oscillograph scientific research have not been performed.

Lead scientist	Dr. J.Spigulis ; Inesa Ferulova
Equipment Purchased	TCSPC (Time-correlated single photon counting) set-up: Photon counting detector, PMC-100-4; Detector's controller DCC-100; Data processing system, SPC-150; Three pico-second lasers: LDH-D-C-405, LDH-D-C-470, LDH-D-C-510; Lasers controller: PDL 800-D.
Amount spent	70866 EUR
Justification for the purchase of equipment	For skin's autofluorescence lifetime measurement. Lasers and lasers controller is one system. With this three wavelengths we worked before, measured autofluorescence photo bleaching. Photon counting detector, Detector's controller, Data processing system, SPC-150 is one system for photon counting and time-correlating; with the minimum requirements for lifetime imaging.
Progress toward task implementation	Participation in two conferences (DOC 2013; BPR-2013) , Proc. paper in SPIE. Investigate the skin autofluorescence lifetimes before and after low power cw laser pre-irradiation
Scientific results	Participation in conference BPR-2013, Proc. paper in SPIE
Equipment Purchased	TCSPC (Time-correlated single photon counting) set-up: Photon counting detector, PMC-100-4; Detector's controller DCC-100; Data processing system, SPC-150; Three pico-second lasers: LDH-D-C-405, LDH-D-C-470, LDH-D-C-510; Lasers controller: PDL 800-D.

	Task 3.6	Advanced upgrade of research equipment for **Fundamental Geodynamical observatory.**		1			1	36

Lead scientist	Kalvis Salmins

Laboratory Upgraded	Institute of Astronomy, Fundamental Geodynamical observatory
Equipment Purchased	GNSS (GPS+GLONASS+GALILEO) receiver Leica GR25 with calibrated AR25 antenna Calibrated Tektronix DC power supplies PWS2185, PWS2721, PWS4205 Mintron night vision camera and 2.4Ghz transmitter/receiver components Leica distance meter with digital point finder Disto D5 Digital multimeter Tektronix DMM4050 Frequency counter Pendelum CNT-91 with high accuracy time base Picoscope USB oscilloscope and signal generator Jewell Instruments digital tiltmeter D701 25m single mode Thorlabs 460HP fiber with custom adapters to fit in the existing SLR system's calibration optical path
Justification for the purchase of equipment	Leica GR25 with calibrated antenna AR25: to upgrade SLR station's existing receiver antenna with state of the art geodetic receiver with support for all major GNSS satellite systems (GPS/Navstar, Galileo and Glonass), high frequency (up to 50Hz) data recording option, multiple data streaming options. Riga 1884 is the EUREF class "A" station and IGS base station. Upgrade will improve station performance and will fulfill the international GNSS network requirements; will allow to participate in upcoming projects like planned Grace-FO satellite mission in 2017. Measurement equipment: digital multimeters, USB oscilloscope, frequency counter are used for the SLR station equipment performance monitoring and testing, particularly to check the existing time and reference frequency setup involving connections between buildings, PMT and telescope optical path alignment. Distance meter with digital point finder: required to remeasure optical patches within telescope, external target distances and horizon masks for GNSS antenna and SLR system. Optical cable: replaced existing multimode fiber cable with unknown properties. Tiltmeter: to monitor telescope vertical axis orientation changes and mechanical accuracy of internal mechanical components and to directly measure certain mount model parameters independently from the star observations. Night camera with accessories: to give station operator a wide angle view on TV monitor of tracking path on sky: cloudiness, approaching planes DC power supplies: to replace old units, some of them more than 25 years old, with new calibrated sources e.g. PMT, laser start epoch circuit.
Progress toward task implementation	Updated requirements for the necessary upgrades to improve performance of the existing system and to participate in upcoming projects like space debris tracking. Next steps: mount model improvement, SLR telescope receiver path performance, time and frequency base upgrade and to develop new telescope control system. Prepared specifications for the new purchases: optical components - lenses, interference filters and dichroic mirrors and related mechanical components; step motors and their controllers, microprocessor boards for the telescope control system, additional time and frequency receiver, signal generators, temperature, pressure, humidity sensors, distributed frequency amplifiers and other accessories.

Scientific results		Improved SLR system calibration accuracy, calibration RMS now is about 7ps instead of 14ps, checked existing time and frequency basis, calculated parameters of the optical elements (lenses) for the SLR system upgrade with reduced number of optical surfaces to improve SLR system receiver path performance. Next steps: after test run to install new GNSS receiver, upgrade event timer and data processing software, purchase necessary components to upgrade telescope receiver path, upgrade time and frequency base, make new telescope mount model incorporating measurements with the tiltmeter, prepare to upgrade telescope controls system hardware and software.						
	Task 3.7	Advanced upgrade of largest in Baltic **wide field Schmidt system telescope.**		1			1	6
Lead scientist		Dr. Ilgmars Eglitis						
Laboratory Upgraded		Institute of Astronomy, upgrade wide field Schmidt system telescope						
Equipment Purchased		Flatbed scanner complex: flatbed scanner scan format 300x400 mm, resolution at least 2400 dpi, optical density up to 3.8 D; connectivity USB 2.0; supported environment, WindowsXP; with computer: dual-core processor; CPU over 2 GHz; RAM 2048 MB; CD-ROM, DVD-RW; 4 USB canals; at least 300 GB HDD; 21-inch LCD monitor;						
Amount spent		2269EUR, excl. 21% VAT						
Justification for the purchase of equipment		Flatbed scanner complex needed to digitalize a wide field Baldone Schmidt telescope astronomical plate archive, which obtained 1966-2005 time period. The uniqueness of plate archive is regular observations almost 40-year long period toward constellation of Swan and anticenter of Galaxy directions. Digitization will give a high volume database which will allow to explore the brightness variability of stars of different spectral types in long time span, to measure the intrinsic speed of stars, to discover new asteroids and comets.						
Progress toward task		The digitalization process was begun.						
Scientific results		1000 astronomical plates from Schmidt telescope archive are digitalized till the July 2013.						
	Task 3.8	**Zenith Refractometer**		1			1	24
Lead scientist		Lead scientist Dr. M.Cakule , Dr. J.Balodis _____						
Laboratory Upgraded		Laboratory Institute of Geodesy and Geoinformatics Upgraded Equipment Purchased						

Purchased components: Justification for the purchase of equipment	* Laptop computer DELL Latitude E5520 15,6" 1366x768/i3-2310M/2GB/DVD-RW/BT/ 802.11n/ Windows 7 Professional * Solid Edge University Perpetual license with technical support (Insight XT/Ms Share Point App) up to 31.08.2015. * CCD matrix: Santa Barbara Instrument Group, model: STT-8300M GNSS receiver: Hemisphere GPS, model: A325 with interface cable multifunctional printer HP Photosmart 6510 e-All-in-One According to concept of zenith refractor: Equipment for mobile computerized large volume data flow registration in field conditions is necessary. The purchased laptop computer will be used for this purpose. It will serve also for mechanical component design and associated calculations using Solid Edge software package and for device control and data acquisition software compiling 2. SBIG CCD matrix will be used for star field image acquisition, necessary to calculate accurate instrument orientation, relative to coordinate system, defined by reference stars. 3. Hemisphere GPS A325 will be used to determine an accurate instrument position in geocentric coordinate system and .time of star imaging events. 4. Tripod and a number of mechanical and electronic components will be used for instrument assembly, power supply, data flow support and control functions.
Progress toward task implementation	*. Software package for event timing and geocentric coordinate data acquisition using Hemisphere GPS A324 is developed and tested * Tests of optical system are being performed * Software packages for reference star catalog download, formatting, data extraction, astrometric apparent position calculations are developed * Work drawings of mechanical components are being prepared. * The progress of design and construction of the instrument is limited by available personnel funding, which, unfortunately is far from adequate.
Scientific results	Instrument is under construction, scientific results are expected when it is at least partly functional.

	Task 3.9	Upgrade of **low pressure plasma research facilities. Postponed to the second part of the project**		1			1	18
	Task 3.10	Advanced upgrade of **electron-beam and resistive evaporation of dielectric, semiconductor and metal multilayer achromatic optical coating installation** - VU-2M for interference mirrors and filters etc. *(250-1100 nm)* with simultaneous photometric layer Testing.		1			1	6

Lead scientist	Dr. Arnolds Ubelis, Electronic Ing. Jānis Blahins
Laboratory Upgraded	Institute of Atomic Physics and Spectroscopy, Labor.of Atomic Phys&Photochem on behalf of new erectable Laboratory of Vacuum Coatings
Equipment Purchased	*Bought:* 1) Ventilator 4000 m3/h 2) Air conditioners 3 pcs

	3) Stainless steel (3 separate cases) 4) Welding electrodes 5) Floor constructive 6) Antidust paints and antidust floor installing *Planed at future:* 7) Vacuum turbo pump with driver module 8) Cryopump with few coldheads and helium compressor; 9) Tangentventilators 10) HEPA filter sections 11) Dust pollution control measurers
Justification for the purchase of equipment	1) For general air inlet to cleanroom where the sputtering laboratory will have processing machinery, calculated in accordance to standard for cleanrooms HVAC systems. Seller was chosen cheapest of those having high enough quality and good exploitation costs 2) Bought according to calculated heat flux from instruments to the dustfree cleanroom to maintain minimum working conditions to personnel (under 27 C), taking in consideration heat balance from air ventilators. Modell was choose with known very good lifespan expectancy, with air nanoparticle electrostatic filtering and anti-humidity functions, and bought in the shop abroad where prices was lower than for less advanced models at Riga. 3) Steel was bought for specific cleanroom environment HVAC, filtering box constructing, ventilation piping needs, for needs of most clean part of cleanroom on-wall ventilator channel mounting and for new large sized astronomical mirror aluminization apparatus vacuum chamber constructing. The seller was chosen as cheapest having the needed assortment. 4) To weld vacuum chaber and mentioned above stainless steel constructions. Seller was used geographically nearest to us who has relatively low price. 5) For cover the technical communication channels (electricity, canalisation, cooling water) with strong, cleanable and easily openable plastic covers, allowing 250 kg/m2. The seller was chosen only at region having such covers. 6) For to insulate a most cleanest part of cleanrooms walls and ceiling with specially designed and qualified for that need antidust paint and paint cleanroom floor with industrial quality antidust qualified plastic covering, and paint all floors for other clean zone laboratory space with less expensive industrial floor permitting to save them well clean. The seller was chosen only in region having quality warranties and good qualification proofs.

Progress toward task implementation	Bought: 1) Ventilator 4000 m3/h, bought, installed for 90%. 2) Air conditioners 3 pcs, bought, installation in progress. 3) Stainless steel, first stocks are already installed, last stock is in progress. 4) Welding electrodes, used for 80%, will be need for buy more 5) Floor constructive, 95% installed 6) Antidust paints and antidust floor installing stopped due plan changes about cleanroom configuration - there stand up idea to widen clean zone, destroy some inner walls, and therefore until now floor is not made ready for painting. Expecting that will be done in September or latest November. Planed at future: 1) Vacuum turbopump with driver module. Specifications are made, but previous concourse returned empty. This time we shall give a few seller name to concourse administrators. 2) Cryopump with few cold heads and helium compressor. Specifications are about be made with a term at 01.09.2013. 3) Tangent ventilators. All trials to buy them from local producer at Germany ended with policy "we are not selling less than million". As soon as we shall find other concurrent the concourse will be opened. 4) HEPA filter sections. Seller is known but forbidden by University regulations. As soon as local laws will be suspended for our case, they will be bought. Laws forbid e-bay and most of EU producers if they haven't undergone long mediator chains, what is unacceptable by viewpoint of price-economy. 5) Dust pollution control measures. Specifications and models are about clear, will be formulated at autumn concourse end-term 01.09.2013.							
Scientific results	Results will be gained at point when all equipment will be laid to work. Today we had tiny test deposition what was used as student (baccalaureate) graduation work experimental part results. At future is planned to process few astronomical mirrors as soon is possible and many at future, is planned to have optical equipment small series producing by demand, is planned to install the negative ion research apparatus GRIBAM at hall next to cleanroom, the crystal growing owe with zone cleaning regime, and use the semi-clean zone for ion implantation instrument constructing and adjusting whilst it stays at us. Later implanter place will be occupied with special laser or precision frequency comb instrument. Cleanroom will be permanently occupied with three deposition devices and sample cleaning equipment.							
	Task 3.11	**SMEs access to FOTONIKA-LV research facilities** in its labs and departments through cooperation in joint projects or via renting of equipment.		1			1	36
Three cooperation projects with SMEs are raised aiming to design unique devices!								

WP 4		***Knowledge Transfer and Research Training: Organization of Conferencies, Courses and Workshops***	LU FOTONIKA-LV	15.0	1	36
	Task 4.1	Presentation and testing the FOTONIKA-LV research community scientific results at **high level international conferences.**			1	36
Reporting WP 4 Task 4.1 first interim report.				18	1	18
• project promoted participation with scientific reports already in 30 Conferences in the first 18 months in comparision with the target: 24 conferences; • Reasons for overshot – scientific productivity of the FOTONIKA-LV team boosted by various activities of the project WPs.; Evidently there is a need to increase the budget for WP4.1 to satisfy the future needs. There are savings in the budget of WP4 for other tasks						
	Task 4.2	**1st International Conference** "Advanced Photonics Technologies" Riga 2012" August 2012 with accompanying exhibition and *Research Training Courses.* .			1	10
Reporting WP 4 Task 4.2 first interim report.				18	1	18
➢ The conference and acompayning events organized succesfully August 23-28, 2012. ➢ http://www.lu.lv/fotonika-lv/realizetie-projekti/regpot-2011-1/konferences/photonics-technologies-riga-2012; ➢ Summary reported in the section of the Project at the annual 71st. Conference *(see attached files);* ➢ Total number of participants: 97 from 14 countries, 7 SMEs contributed to the exibition; ➢ Training courses – 40 young researchers. 11 lectures delivered; The Conference: 12 plenary lectures; 22 lectures in parallel sesions *(including young reserachers*); 19 posters of young researchers as well.						
	Task 4.3	**1st International conference** "BIOPHOTONICS – RIGA 2013" in summer 2013 with accompanying *Research Training Courses.*			9	22
Reporting WP 4 Task 4.3 first interim report.				18	1	18
➢ Conference, Exhibition for SMEs and Training course in Riga, University of Latvia was under preparation during the first 18 months of the project and was scheduled26-31 August, 2013: http://www.lu.lv/fotonika-lv/realizetie-projekti/regpot-2011-1/konferences/biophotonics-riga-2013: ➢ accepted Young Researcher's for Training course / Presentations at the Conference – 38; ➢ Tutors for Training course – 20 from 9 countries (Australia, Estonia, France, Germany, Lithuania, New-Zealand, Russia, Sweden, Ukraine); ➢ Plenary presentations – 18 (from 10 countries); Conference Abstract booklet – under preparation						
	Task 4.4	**1st International Conference**: "Remote Sensing in Night time atmosphere and Nighttimes photochemistry – Riga 2014"			20	33
The conference is scheduled in late 2014. or earlier 2015						
	Task 4.5	**3rd International Conference** on Integrative Approaches Towards Sustainability: "Sustainable development, knowledge society and smart future			1	10

		manufacturing technologies".				
Reporting WP 4 Task 4.5 first interim report.				18	1	18
The Conference was organised on 27-30 June, 2012: http://www.lu.lv/knowledge; Results: ➢ 61 Participants form 15 countries; ➢ 14 Plenary lectures (including 3 Skype presentations), 16 presentations on Parallel sessions, 25 oral/poster Presentations from Young researchers, 2 round-table discussions; ➢ reported on the 71st Scientific Conference of the University of Latvia; Conference Proceedings in Peter Lang Publishing House under preparation *(Series "Environmental Education, Communication and Sustainability")*						
	Task 4.6	Three strategy planning and technology foresight **workshops.**			1	36
Reporting WP 4 Task 4.6 first interim report.				18	1	18
The organization of the first strategy planning and technology foresight workshop was delayed due to overload of the team of strategy partners at the *Fraunhofer*-Institut für System- und Innovations forschung. Another reason for the delay is unexpectedly low national financing to institutes of the Association FOTONIKA-LV accordingly limited capacity of human resources which could be involved in specifically trained foresight team which can raise mentioned above activities timely. Substantial progress was made during the last year via following: ➢ Association FOTONIKA-LV is defined as an associated partner to the project FP7-PEOPLE-2011-IRSES International Foresight Academy, Grant: 294959 (IRSES-International Staff exchange); ➢ The first workshop scheduled to April 2012 is now foreseen in October 2013. Two preparatory events were organized in July 25 /July 26, 2013 and several meetings with the deputies of Parliament and visiting meeting of the Parliament Innovation subcommittee were organized together with the FOTONIKA-LV community.						

WP 5		***Dissemination, promotion, contribution to innovation - Public access Riga Photonics Centre***	LU FOTONIKA-LV	72	1	36
	Task 5.1	Purchasing and installation of office technologies for planned **Riga Photonics Centre** and establishment of the centre.			1	6
Reporting WP 5 Task 5.1 first interim report.				4	1	18
All necessary purchases are made.						
	Task 5.2	Launch and running of the portal *WWW.ASI-PHOTONICS.LV*			1	36
Reporting WP 5 Task 5.2 first interim report.				1	1	18
Agreement was reached with the University services and the portal www.lu.lv/FOTONIKA-LV .was launched.						
	Task 5.3	Day to day dissemination, publicity, knowledge & innovation transfer and user driven project promotion activities.			1	36
Reporting WP 5 Task 5.3 first interim report.				18	1	18
The Riga Photonics Center sustains day to day activities towards various corporate tasks. Various events to raise awareness on photonics to the secondary school teachers and students were raised. The EU Researchers NIGHTS event was specifically supported in year 2012. and has excessive number of visitors due it`s position in down-town of Riga and attractive agenda.						
	Task 5.4	Contribution to innovation – training on IPR issues			1	36
Reporting WP 5 Task 5.2 first interim report.				1	1	18

Inventory of basic and applied capacity in Latvia and in Estonia and Lithuania is made in the doma of Photonics, Quantum Sciences and Technologies and the first workshop organized: ***PHOTONIC AND QUANTUM TECHNOLOGIES***
REGIONAL SMART SPECIALIZATION DOMAIN IN LATVIA AND BALTIC COUNTRIES
The 1st regional workshop
Inventory of capacity:
Human resources; Industry; Intellectual capital and IPR assets.

Time: ***Friday, 26.07.2013.***, *13.00-17.00*
Venue: *Institute of Atomic Physics and Spectroscopy (Association FOTONIKA-LV*
, Šķūņu 4. auditorium, 4. floor, Old Riga
Chair: **A. Ubelis (chair)** (www.lu.lv/FOTONIKA-LV)

WP 6		**Policy Development, Management and Quality Assessment**	LU FOTONIKA-LV	36	1	36
	Task 6.1	**National and regional scale policy development efforts** including 3 strategy planning workshops with technology foresight exercises for national and regional scale developments in photonics.			1	36
Reporting WP 6.Task 6.1 first interim report.				18	1	18

Besides of efforts mentioned above a lot of another efforts were made. More important are:

- ***THE FIRST FOTONIKA-LV VISITING WORKSHOP TO SMEs***

FOTONIKA-LV & Z-LIGHT
The 1st interactive workshop for cooperation
PHOTONICS AND QUANTUM TECHNOLOGIES
Agenda and Logistics

Logistics for 25.07.2013:
13.30 - meeting of participants in Old Riga to take a bus
14.10 – Riga Airport to pick-up Carlos Lee General Director of European Photonics Industry Consortium
14.30 – 17.30 Bus drive to Livani
17.30- 21.00 The workshop
21.00 – 24.00 Return to Riga

THe Workshop:
Time: ***Thursday, 25.07.2013.***, *17.30-21.00*
Venue: *Premises of Z-Light, Livani*
Chair: **A. Ubelis (chair)** (www.lu.lv/FOTONIKA-LV)

17.30 – 18.00 *Welcome coffee and introductory speeches.*
Arnolds Ubelis Smart specialization in Latvia Photonics and Quantum Technologies -10 minutes;
Carlos Lee - introduction to European Photonics Industry Consortium – 10 minutes;
Daumants Pfafrods – Z-Light short introducing story
18.00 – 19.30 *Technical visit in various parts of Z-Light enterprise;*
19.30 - 21.00 *Interactive discussions on short-term and long-term cooperation strategies and pending current and nearest activities and needs*
Concluding Remarks.

- ***The visit of Carlos Lee General Director of European Photonics Industry Consortium -*** *www.**epic**-assoc.com* in Latvia and contacts with several SMEs of Photonics domain*;*
- ***Invitation to several Latvian SMEs and also to Association of FOTONIKA-LV to membership in EPI***
- ***Intensive communications with the ministries and Parliament***

	Task 6.2	Overall project management including virtual efforts in the project portal and monthly quality assurance meetings of the project team.			1	36

Reporting WP 6. Task 6.2 first interim report.				18	1	18
Day to day efforts of project management were made and were more complicated and consuming more administrative efforts than expected in the project application phase. The university management system is not design to manage large scale research projects. Its becomes evident that Association FOTONIKA-LV need to have status of Legal person in order to be flexible in decision making and fast in large project implementation: current one, pending large HORIZON 2020 projects; large scale national and EU level industry applied research contracts. Foreseen monthly quality assurance meetings of the project team were linked together with the presence of team members in the colloquiums of the FOTONIKA-LV which has regularity 1-2 times per months.						
	Task 6.3	Management meetings and reporting scheme.			1	36
Reporting WP 6 Task 6.3 first interim report.				18	1	18
To be more effective by ourselves the management meetings of the project team. Were substituted via weekly 30 minutes meetings of project team were the project Board members and lead researchers are present and SSC chair prof. Andrejs Silins is informed.						
	Task 6.4	Reporting to European Commission			1	36
Reporting WP 6 Task 6.4 first interim report.				18	1	18
The information necessary for the reporting were collected via day to day efforts. All participants of research community of FOTONIKA-LV are invited to contribute to the section of 71 Annual conference of the University of Latvia with the reports and posters of the project first year's outcomes. The booklet of abstracts attached. The same will be done for the 72. Annual conference to get overview summary for the second year of the project.						
	Task 6.5	Supervision of reporting of outgoing and incoming researchers and recruited staff. Overall task to be implemented in cooperation with other WP's.			1	36
Reporting WP 6 Task 6.5 first interim report.				18	1	18
Besides reports collected in deliverable file of the workshop various other measures are present to ensure informal and collegial supervision via discussions in small groups, seminars at laboratory, department and observatory level, presentations to colloquiums at FOTONIKA-LV level and regular seminars at the institutes level.						
	Task 6.6	Internal quality assurance and audits.			1	36
Reporting WP 6 Task 6.6 first interim report.				18	1	18
Internal quality assurance and audits was performed via the complex of measures already mentioned above and the highest audit values will be new project proposals, publications in peer review journals and patent applications						

Wp7		**Ex-post Evaluation of applicant's research potential**	LU FOTONIKA-LV	20	37	42
	Task 7.1.	Ex-post evaluation of Association Fotonika-LV research potential			37	42

Table 2. Summary of staff effort in the first 18 months of the project

Total:

Participant no./short name	WP 1	WP 2	WP 3	WP 4	WP 5	WP 6	WP 7	Total person months
LU FOTONIKA-LV	58	411	6	15	72	36	5.5	603,5
WP leader	**6**	**3**	**6**	**15**	**72**	**18**	**2**	**140**
Total	58	411	6	15	72	36	5,5	603,5

The first 18 months:

Participant no./short name	WP1	WP2	WP 3	WP 4	WP 5	WP 6	WP 7	Total person months
LU FOTONIKA-LV	38,8	127,5	4,5	8,2	26,8	18	0	223,8
WP leader	**3,4**	**1,6**	**4,5**	**7,7**	**26,8**	**18**	**0**	**62**
Total	38,8	127,5	4,5	8,2	26,8	18	0	223,8

Table 3. Planning and timetable

Year month / Work package	2012											2013											
	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
WP 1																							
Task 1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 1.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WP 2																							
Task 2.1.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.2.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.3.							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.4.																							
Task 2.5.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.6.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.7.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.8.							X	X	X	X	X	X	X	X	X	X	X	X					
Task 2.9.				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.10.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 2.11.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WP 3																							
Task 3.1.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 3.2.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 3.3.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 3.4.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Task 3.5.	X	X	X	X	X	X	X	X	X	X	X	X											
Task 3.6.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 3.7.	X	X	X	X	X	X																	
Task 3.8.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 3.9.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
Task 3.10.	X	X	X	X	X	X																	
Task 3.11.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WP 4																							
Task 4.1.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 4.2.				X	X	X	X	X	X														
Task 4.3.								X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Task 4.4.																				X	X	X	X
Task 4.5.						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Task 4.6.	X	X	X	X	X	X	X	X	X	X	X	X											
WP 5																							
Task 5.1.	X	X	X	X																			
Task 5.2.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 5.3.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 5.4.									X	X	X										X	X	X
WP 6																							
Task 6.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 6.2.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Task 6.3.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 6.4.													X									
Task 6.5.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Task 6.6.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WP 7																						
Task 7.1																						

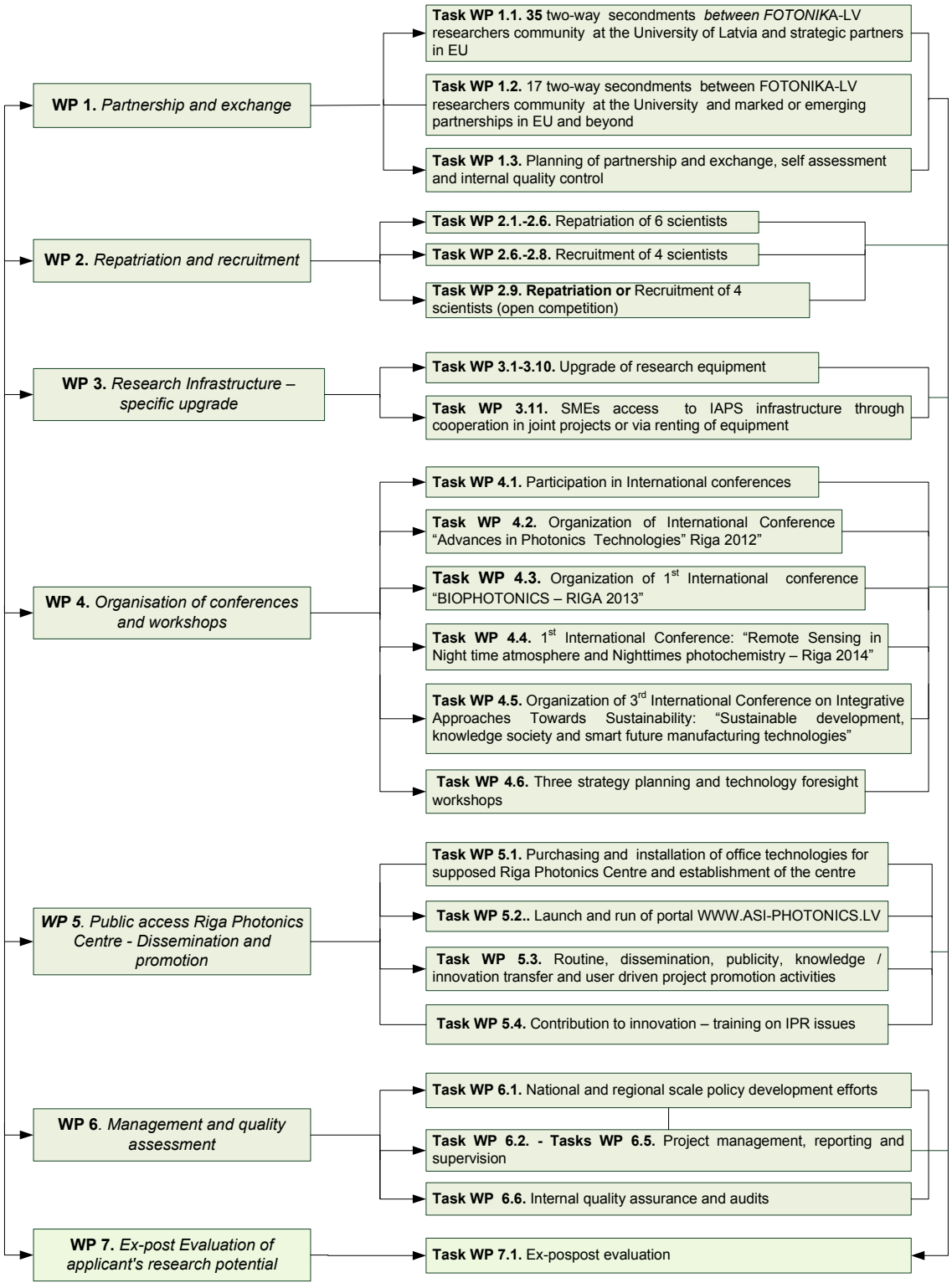

Table 4. Schematic presentation of Work packages and their tasks

2. *Implementation*

2.1 Management structure and procedures

2.1.3. Management and reporting

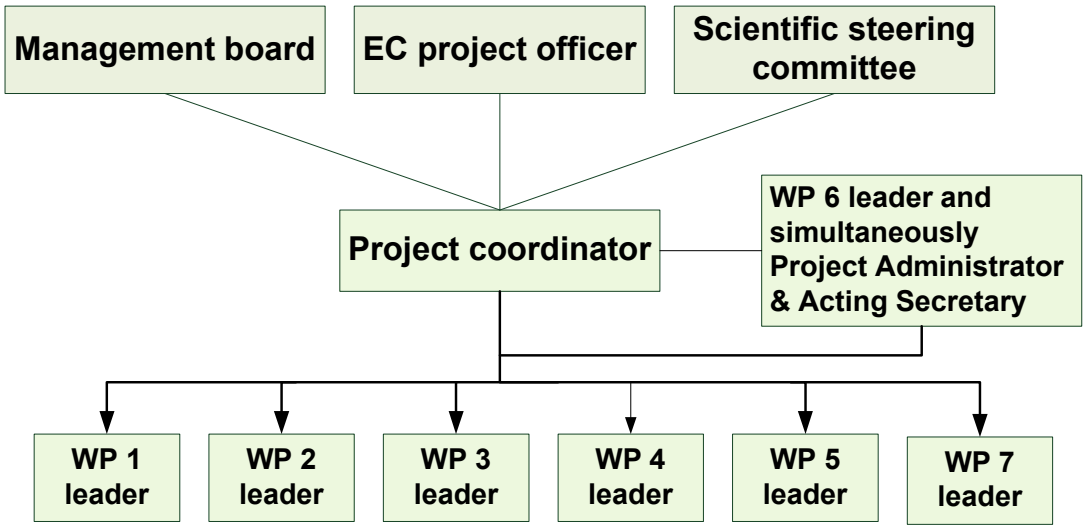

Figure 2. Management and reporting

2.1.2. Management Board will be formed from leaders of 4 labs and 5 departments of FOTONIKA-LV association, therefore:

- being experienced researchers by themselves;
- having strategic visions on future developments of their units;
- being deeply involved in project design and development;

They will be the right persons guide the project developments and assist to Coordinator in project implementation in effective way.

The Project Management Board is composed of:

Arnolds Ubelis, coordinator;
Maris Abele, Leader of Optics and mechanics department at LU AI;
Kazimirs Lapuska, Leader of Fundamental Geodynamical observatory at LU AI;
Janis Spigulis, Director of LUASI and Leader of Biophotonics group, at LU ASI;
Marita Cekule, Leader of Department of Geodesy at LU GGI;
Janis Balodis, Leader of Department of Geoinformatics at LU GGI;
Atis Skudra, Leader of High-resolution Spectroscopy and Light Source Technology at LU ASI
Ilgmars Eglitis, Leader of Astrophysics Observatory at LU AI;
Imants Bernsons, Leader of Laboratory of Theoretical Physics at LU ASI

2.1.3. **Scientific Steering Committee**

The Chair of Council of Sciences of Latvia will be invited to chair the **Scientific Steering Committee** having responsibility to*:*

1. Monitor the project development;
2. To provide helpful advises on project implementation;

3. Promote advancement of strategic decisions un national decision making level regarding the continuity and sustainability of project efforts, outcomes, results and findings, mainly e.g.:
   - increased priority ranking and emergence of national RTD programme "PHOTONICS-LV";
   - relevant and "intelligent" innovation strategy in the field;
   - Private public partnership and promotion of national participation in EU Technology Platform PHOTONICS 21;
   - Promotion of photonics project calls from national budget and EU structural funds;
   - Promotion of coordinated actions in Baltic countries;
   - Promotion of membership of Latvia in European Space Agency.

3. Impact

3.1. Impacts from the implementation of the project during the first 18 project months:

The highlights of main results, benefits and impacts during the first 18 are listed below:

- The shared research experience and exchanged know-how on the cutting-edge photonics problems increase scientific capacity of all three research institutes of Association FOTONIKA-LV
- The performed exchanges and joint research with the scientists from the leading EU research centres raisedcompetence and expertise in photonics of young and established researchers of Association FOTONIKA-LV;
- The competence and the quantity and quality of the experimental and theoretical research is substantially increased;
- Several new research directions at the Association FOTONIKA-LV are established.;
- Photonics research infrastructure of Association FOTONIKA-LV is substantially improved, making possible to continue the basic and applied research on qualitatively higher level;
- Publicity and visibility of Association FOTONIKA-LV in the EU and the world photonics community is raised;
- Photonics is getting wider publicity but still fail to deserved noticeable support on national level in Latvia;
- National-scale ***Riga Photonics Centre*** for knowledge transfer and publicity activities is established at the Association FOTONIKA-LV, with potential to serve as a FP7 "success story";
- The photonics research results of Association FOTONIKA-LV reported at international conferences are visible by the international community, and new research contacts and networks are established;
- Experience on the implementation of innovative photonics promotion methods are shared with the research community of photonics, quantum sciences and technologies in Latvia and in neighboring Estonia and Lithuania. ;

The first 18 months of the project contributed significantly to unlocking of the research potential in Latvia and neighboring Lithuania and Estonia in the field of photonics, trying as much as possible to overcome fragmentation and to initiate development of common strategies.

Implementation of the project contributed to better integration of the project participants and partners in the European Research Area as a whole, making long lasting partnership with research groups elsewhere in partner organizations via direct contacts and new FP7 project proposals and retained projects .

Table 5. Beneficiaries from Work plan implementation in the first 18 months

Laboratories&departments of Association „Fotonika-LV" at the University of Latvia – direct beneficiaries		
	Benefiting Unit or target group	**Expected benefit from implementation of the work** (related WP and task number)
1)	Laboratory of-Atomic Physics, Atmosphere Physics and Photochemis-try at LUASI	***WP – 2, Tasks 2.1., 2.2., 2.3, 2.4., 2.6., 2.7., 2.9., 2.10.*** "Brain gain" and improved human via **repatriation** of experienced researchers: ***Dr.hab. Uldis Berzins***, Sweden, (*trained at the LUASI);* ***Dr. Aigars Ekers***, European Science Foundation, *(trained at the LUASI);* ***Dr. Janis Alnis***, Max Plank institute of Quantum Optic, Munich, *(trained at the LU ASI);* ***Highly qualified Technician Janis Blahins*** *(previously worked in LU ASI)**;*** ***Via recruiting of experienced researchers:*** Prof. **N. Bezuglov** (*Fock Institute of Physics, St. Petersburg State University, St. Petersburg, Russia*); Dr. ***Christina Andreeva-Markovska*** *(Bulgarian Academy of Sciences, Sofia,)* Dr. Roman Viter, University of Odessa ***WP-3, Tasks 3.1, and 3.10.*** Improved R&D infrastructure via: upgrade of coherent light sources, light detection, light handling, and spectroscopic instrumentation in VUV, UV, VIS, and near IR, upgrade of vacuum systems enabling higher vacuum and thus new applications (*e.g., laser cooling*), upgrade of electron-beam and resistive evaporation for dielectric, semiconductor and metal multilayer achromatic optical coating *(VU-2M for interference mirrors, filters etc. in the spectral range 250-1100 nm),* and development of Night-Time Cartography of Atmosphere by Exposing Satellite Instruments with a White Light Beam from the Earth's Surface;
2)	*Department of Optics and Mechanics at LU AI*	***WP2, tasks 2.4., 2.7.*** "Brain gain" and improved human potential via repatriation *of experienced* ***Dr. Janis Alnis***, Max Plank institute of Quantum Optic, Munich. And recruitment of ***Dr.Maris Ābele*** ***WP3, task 3.10.*** Improved R&D infrastructure via: *advanced upgrade of electron-beam and resistive evaporation of dielectric, semiconductor and metal multilayer achromatic optical coating installation - VU-2M for interference mirrors and filters etc. (250-1100 nm);* *Purchase of equipment to design lab made working model device for Night-Time Cartography of Atmosphere by Exposing Satellite Instruments with a White Light Beam from the Earth's Surface.*
3)	*Fundamental Geodynamical observatory at LU AI*	**WP2, task 2.4., 2.7.** "Brain gain" and improved human potential via recruitment *of experienced researcher:* ***Jorge DelPino*** **WP3 tasks *3.1, 3.2.,* 3.6., *3.10.*** Improved R&D infrastructure via Advanced upgrade of research equipment for Fundamental Geodynamical observatory Development of new methods for SLR Advanced upgrade of electron-beam and resistive evaporation of dielectric, semiconductor and metal multilayer achromatic optical coating installation - VU-2M for interference mirrors and filters etc. *(250-1100 nm)* with simultaneous photometric layer testing.
4)	*Biophotonics laboratory LU ASI*	***WP 2, Task 2.1.*** Benefit from Transfer of Knowledge related to hot topics of biomedical optics and biophotonics related to optical assessment of blood microcirculation via a secondment of **Prof. A. Priezzhev,** *(Moscow State University, Russia*). ***WP2, task2.8***

		"Brain gain" and improved human potential via **recruitment of experienced researcher *Dr. Roman Viter*** *(Ukraine)* to develop new fibre-optical biosensors for express-diagnostics and other biomedical application. "Brain gain" and improved human potential via repatriation of experienced researcher ***Dr.hab.Uldis Berzins***, Sweden, Micronics Laser Systems Ltd *(trained at the LUASI)* ***WP3, task 3.2*** *Improved R&D infrastructure via acquisition of femtosecond laser for applications in the development of new time-resolved fluorescence and remittance technologies for skin assessment*
5)	*Department of Geodesy at LU GGI*	***Dr. Janis Alnis***, Max Plank institute of Quantum Optic, Munic. ***Task 3.1, Task 3.2*** *Benefit from development of new methods for SLR* ***WP3, task 3.6. 3.8., 3.10*** Improvement of R&D infrastructure via Advanced upgrade of research equipment for Fundamental Geodynamical observatory Development of Zenith Refractometer Advanced upgrade of electron-beam and resistive evaporation of dielectric, semiconductor and metal multilayer achromatic optical coating installation - VU-2M for interference mirrors and filters etc. (250-1100 nm) with simultaneous photometric layer testing.
6)	*Department of Geoinforma-tics at LU GGI*	***WP3 task 3.7.*** Improved R&D infrastructure via: upgrade of largest Baltic wide field Schmidt system telescope.
7)	*High-resolution Spectroscopy and Light Source Technology at LU ASI*	**WP1. Task 2.1.** *Benefit from Repatriation of experienced researcher Dr.hab.Uldis Berzins*, Sweden. **Task 3.4.*, 3.8., 3.9.,*** Improved R&D infrastructure via: Upgrade of UV and vacuum UV, spectroscopy instrumentation, and linked quartz & glass blowing workshop and technology laboratory and development of far UV laser spectroscopy
8)	*Astrophysics Observatory at LU AI*	***Brain gain via recruitment o0f two experienced researchers from Lithuania*** ***WP3 task 3.7.*** Advanced upgrade of largest Baltic wide field Schmidt system telescope.
9)	*Laboratory of Theoretical Physics at LUASI*	***WP2, tasks 2.1. 2.9.*** *Brain gain" and improved human via **repatriation** of experienced researchers:* ***Dr.hab. Uldis Berzins***, Sweden; Prof. ***N. Bezuglov*** (*Fock Institute of Physics, St. Petersburg State University, St. Petersburg, Russia*);
Photonics Small and Middle size Enterprise community in Latvia and the Baltic states – direct beneficiaries		
1.	**SMEs community in Latvia**	1. *Availability of updated photonics related information from the website: www.lu.lv/FOTONIK-LV(wP Nr.5);* 2. *Direct and virtual services from Riga Photonics Centre (WP Nr.5);* 3. *Enhanced networking with researchers in the field of photonics via activities of FOTONIKA-LV, technology transfer from FOTONIKA-LV, and access to cooperation with the strategic partners of FOTONIKA-LV as well as anticipated new partners within ERA and beyond (WP1);* 4. *Access to FOTONIKA-LV research infrastructure via cooperation in joint projects or via application for access time to this infrastructure.*
2.	**SMEs community in Estonia**	1. *Availability of updated photonics related information via the website: www.lu.lv/FOTONIK-LV (WP Nr.5);* 2. *Virtual services from Riga Photonics Centre (WP Nr.5);* 3. *Enhanced networking with researchers in the field of photonics via activities of FOTONIKA-LV, technology transfer from FOTONIKA-LV, and access to*

		cooperation with the strategic partners of FOTONIKA-LV as well as anticipated new partners within ERA and beyond (WP1).
3.	**SMESs community in Lithuania**	1. *Availability of updated photonics related information from the website: www.lu.lv/FOTONIK-LV (WP Nr.5);* 2. *Virtual services from Riga Photonics Centre (WP Nr.5);* 3. *Enhanced networking with researchers in the field of photonics via activities of FOTONIKA-LV, technology transfer from FOTONIKA-LV, and access to cooperation with the strategic partners of FOTONIKA-LV as well as anticipated new partners within ERA and beyond (WP1).*
Benefits to national and regional Science Policy Development		
1.	**Policy makers**	*Science policy briefings based on analysis of the scientific, economical and social indicators prepared by FOTONIKA-LV and communicated to national Parliament members and national and regional members to the European Parliament by Riga Photonics Centre (the main dissemination and communication tool of FOTONIKA-LV). The best case scenario includes development of a workable national strategy for innovation and technology transfer going beyond the trivial statements that R&D must result in innovation and technology transfer.*
2.	**National Government and relevant , ministries**	*Long-range plan and roadmap for the development of the photonics discipline in Latvia and assessment of economical impact performed by FOTONIKA-LV. Communication to the executive power will be maintained and managed by Riga Photonics Centre throughout the duration of the project and beyond. The best case scenario presumes stimulating the creation of a practicable and concrete national R&D strategy and bringing photonics among the national R&D priorities and .*
3.	**Science Council of Latvia**	*Consulting and advise on photonics R&D, innovation, and technology transfer; peer review support via the scientific community encompassed by FOTONIKA-LV and its strategic partners. The best case scenario includes thematic calls in the field of photonics.*
General public in Latvia and in Riga - indirect beneficiaries		
1.	**General public in Latvia**	1. *Promotion of knowledge based society and knowledge economy;* 2. *Increased overall human potential (achieved via knowledge exchange and partnerships) eventually leading to more innovation, more exports and contracts in photonics R&D domain;* **3.** *More long-term employment opportunities due to the industry development; mitigated social tensions.* ➢ *A small scale example of knowledge-based society and of functioning of European Research Area concept leading to practicable and measurable societal benefits in terms of industrial products and improved welfare due to developing industries.*
2.	**General public in Riga**	➢ *Promoted visibility and prestige of Riga as city of technology and innovation;* ➢ *In long-term - benefits from increased employment opportunities and increased tax incomes with positive effects on improved quality of education.*
		Secondary Schools and Universities in Latvia
➢	**Secondary schools**	➢ *Stronger interest among students in exact sciences due to a more attractive image of intelligent and better earning intelligent workforce in the sector of R&D and innovation;* ➢ *Improved quality of teaching in sciences due to training of students in FOTONIKA-LV who will later assume teacher's careers.*
➢	**Universities**	➢ *More opportunities for a larger number of BSc, MSc and PhD thesis works within the field of photonics with the dimension of innovation and technology transfer, as well as opportunities for students to assume careers in industry after the studies.* ➢ *Improved quality of training for students via BSc, MSc and PhD thesis works using the upgraded infrastructure of FOTONIKA-LV.* ➢ *Improved content of training via schools, workshops, conferences, training courses, seminars, and colloquia organised by FOTONIKA-LV.*