The project FOTONIKA-LV, Nr. 285912
Summary of outcomes
23.04.2015
Dr. Ph. Arnolds Übelis
arnolds@latnet.lv

The FOTONIKA-LV conference
“Achievements and Future prospects”
(The FP7-REGPOT-2011-1, Nr. 285912 project FOTONIKA-LV
“Unlocking and Boosting Research Potential for Photonics in Latvia – Towards Effective Integration in the European Research Area”)
Riga, 23-24 April, 2015
Venue: Latvian Academy of Sciences
Dedicated to the 5th Anniversary of Association FOTONIKA-LV

Ubelis, FOTONIKA-LV/285912,
24/04/2015
5 years anniversary of the bottom-up initiative of researchers at three institutes with long-term traditions in making excellent science to create the association of research institutes targeted to the domain of photonics, quantum physics and quantum technologies.

FOTONIKA-LV at the University of Latvia

Founded 24/04/2010 via bottom-up initiative of the researchers

19/01/2012 – by the decree of the Rector Nr/1/18

Association FOTONIKA-LV ranked as prioritized scientific project at the University

Scientific Secretary Dr. Arnolds Ūbelis

Administrator Mg.sc.oec. Sandra Šmaliņa
In April 2010, three institutions of the University of Latvia (Atomic Physics and Spectroscopy, Astronomy and Geodesy and Geoinformatics) established the association FOTONIKA-LV with the aim to take responsibility for sustainable advancement of the sector of photonics in Latvia. The association submitted an ambitious FP7 project of basic and applied research in traditional and innovative fields of photonics: REGPOT–2011-1.
The project for the call FP7-REGPOT-2011-1
FOTONIKA-LV, reg. Nr. 285912

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

Duration of the project - 36+6=42 months

EU contribution: 3,752,997.00 €

Started: February 1st, 2012 – ending 31.07.2015

Ubelis, FOTONIKA-LV/285912,
24/04/2015
Leadership of WP

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 training, organisation of workshops, conferences and summer schools - WP4;
- WP leader: Dina Berzina

Dissemination, promotion, contribution to innovation-Public access Riga Photonics Centre - WP5;
- WP leader: Vidvuds Beldavs, Aigars Atvars

Policy development, Management and Quality Assessment - WP6;
- WP leader: Sandra Smalina
- Ex-post Evaluation of FOTONIKA-LV research potential - WP7
- WP leader: Arnolds Ubelis
Budget estimate of the Project

- Total for WP1: 305,600 €
- Total for WP2: 1,378,500 €
- Total for WP3: 1,140,000 €
- Total for WP4: 271,700 €
- Total for WP5: 283,900 €
- Total for WP6: 128,700 €
- Total for WP7: 96,000 €

Subtotal: 3,604,400 €
Indirect costs 20% - 459,880 €
Total: 4,064,280 €
EU contribution: 3,765,358 €
All departments and laboratories in three research institutes of the Association FOTONIKA-LV benefited from unlocking the scientific potential via direct involvement of their staff in the project activities or indirect publicity of the project.

Dr. Ph. Arnolds Übelis
arnolds@latnet.lv/
Departments and laboratories of FOTONIKA-LV

Institute of Atomic Physics and Spectroscopy
- **Bio-optics and Fibre-optics** - LU ASI;
- **Laboratory of Atomic Physics, Atmosphere Physics and Photochemistry** - LU ASI;
- **Laboratory of High Resolution Spectroscopy and Light Source Technology** - LU ASI;
- **Laboratory of Quantum Optics** - LU ASI;
- **Laboratory of Theoretical Physics** - LU ASI;

Institute of Astronomy
- **Department of Optics and Mechanics** - LU AI;
- **Fundamental Geodynamical Observatory** - LU AI;
- **Astrophysics Observatory** - LU AI;

Institute of Geodezy and Geoinformatics
- **Department of Geodesy** - LU GGI;
- **Department of Geoinformatics** - LU GGI;
Riga Photonics Centre
There is a deep background behind our success, even symbolics of the architecture helped to us.

Šķūņu iela 4 (Rīga), The Architecter Mandelštams, 1911.

In the building neoclasical style is combined with Jugendstyle.
The child's sculptures on the portal symbolize intermediators between intelectual and material worlds.

•http://www.jugendstils.riga.lv/JugendstilsRiga//Mandelshtams/skunu4/
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 RTD sector in Latvia.

The implementation of the Project resulted in transformation of Association FOTONIKA-LV in National Science Centre FOTONIKA-LV “de facto” a unique research structure in Latvia and in the three Baltic states.

We are sustaining bottom-up initiative for pan-Baltic regional smart specialization in the domain Photonics, Quantum Sciences, Space Sciences and Related Technologies.

All three countries has excellent research outcomes in the domain and a community of more than 60 research driven SMES in the sector with turnover in 2014 close to 150 M € with historical and forecast growth in the range of 15% annually.
THE PARLIAMENT
POLITICS, POLICY AND PEOPLE MAGAZINE

THE GREEN WEEK ISSUE

Janez Potočnik on why we need to treat water as a vital natural resource

Green Week:
Connie Hedegaard, Ida Auken, Czeslaw Adam Sikorski, Jacqueline McGlade, Richard Seebuer, Ramon Luis Valcarcel, Sissi, Pekka Pesonen

EU-China relations:
Joseph Daul, Piotr Duda, Wu Hailong, Klaus Ehmke, Willy Faure, Chen Yao, Li Jinn

Plus: Coverage of the Parliament Magazine's roundtable debates on kidney disease and decentralised energy

COME AND VISIT THE PARLIAMENT MAGAZINE'S STAND AT GREEN WEEK
The project: FP7-REGPOT-2011-1, FOTONIKA-LV - Unlocking and Boosting Research Potential for Photonics in Latvia – Towards Effective Integration in the European Research Area

Grant agreement 285912 (2012-2015)

According to its work programme the "Research Potential" Activity of EU FP7 was set up to reinforce the capacity of excellent research institutions located in Convergence and Outermost Regions of the EU and in associated countries allowing them to become visible and competitive in European Research Area and to contribute to the regional knowledge economy. The programme was extremely attractive among recognized research structures in the defined regions and about 1,600 project proposals were submitted to 5 calls during 2007-2011. Among them close to 600 were above the quality threshold. Unfortunately, due to limited financing allocated to the programme only 105 projects were financed resulting in an average 7% success rate for the call.

The project FOTONIKA-LV succeeded in the call FP7-REGPOT-2011 in the competition of 291 proposals and was ranked second of the 20 financed projects.

The project is coming from Riga – intellectually and technologically ambitious city of the last 100 years called the capital of Art Nouveau (Jugendstil) thanks to the wealth of the city at the beginning of last century. The city authorities of that time advised - all newly designed houses should have elements of the Art Nouveau. At the beginning of the 20th century, when the Industrial Revolution was in full swing, Riga ranked high among the technologically advanced European cities with factories producing trains, cars, planes, and bicycles. Together with its ship-building and textile industries that produced the wealth reflected in Art Nouveau (Jugendstil) – an expensive but, nevertheless, dominant style of the architecture of Riga during the early 20th century.

FOTONIKA means photonics in Latvian and the project was raised by the Association FOTONIKA/LV at the University of Latvia. The FOTONIKA-LV Association was formed more than 2 years ago as a bottom-up initiative of researchers of three well recognized research institutes of classical sciences having a history of doing good science for decades - LRASL, LRALG, LUSTU 2. Photonics - the science and technology of generating, controlling, and detecting photons is unifying more than 100 researchers of the three institutes covering photonics for space and Earth, bio-photonics, and photonics in micro-world. By forming the Association the three research institutes created the "critical mass" for large projects and agreed to take efforts to leadership in restoration and strengthening the basic

The project started a few months ago on February 1, 2012. The money allocated for unlocking and boosting the research potential is going to be used for: second visit to take from the 10 strategic partnership institutions (and more than 10 another institutions) for joint experimental efforts and knowledge exchange; for repatriation of 6 best former colleagues; for recruitment of experienced researchers from abroad to strengthen the human capacity in the labs and departments, for upgrading research facilities; for promotion and training activities, i.e., Riga Photonics centre, 4 large-scale conferences (first of them – the project’s contribution to sustainable development, will take place already in late June this year) technology foresight workshops, etc. Since the start of our project 3 colleagues are repatriated: the first Latvian M-C fellow in 2006, now experienced researcher Dr. Atis Eberes, Dr. habil. Ulis Birznieks, having excellent basic research experience combined with 10 years of work in applied research laboratory of a private company in Stockholm and highly skilled technician Jānis Blaumis. We are looking forward to repatriate Dr. Jānis Ahkis, another M-C fellow of ours, with excellent scientific record from the Max Planck Institute of Quantum Optics, just now co-authoring a recent paper in Science. Besides, 4 foreign researchers are already recruited. The project is looking for 3-4-moms. During the pre-project phase and during the first months of implementation 3 new FP7 projects have been submitted and retained for financing, and several more are in preparation or will be resubmitted after improvement.

Raised by bottom-up initiative the Association FOTONIKA-LV is emerging as a significant national science centre in the forefront of Latvian RTD community in its struggle to regain the previous science
Tautsaimniecības, agrārās, vides un regionālās politikas komisijas
Inovāciju un zinātnes apakškomisijas
2013. gada 19. februāra sēde

Sēdes sākums plkst. 12.00

Šķūnu ielā 4, asociācijas
FOTONIKA-LV telpās

Pulcēšanās gājienam uz Šķūnu ielu 4 plkst. 11.45 pie Saeimas ēkas
Jēkaba ielā 11

Darba kārtba:

1. Par asociācijas FOTONIKA-LV zinātniskiem projektiem un
attēlības perspektīvām (www.lu.lv/fotonika-lv, fotonika ir viena no sešām
prioritārā jomām ES līdz 2020.gadam, turklāt pati lielākā pēc tirgus apjoma un

Informē: projektu koordinators
Dr.Ph. Arnolds Ūbelis

Ubelis, FOTONIKA-LV/
285912, 23.04.2015
Association FOTONIKA-LV
National scale science centre

“de Facto”
already now

 obriged to become visible and significant player
in European Research Area

That means - grows in size from more than 115 employees and students in 2013 till 200 in year 2015-2016 with annual budget up to 5 million EUR

And with significantly improved scientific and physical infrastructure

Ubelis, FOTONIKA-LV/
285912, 23.04.2015
WHY WE ARE STILL in THE SAME SIZE!!!!

Latvia. Innovation System Review and Research Assessment Exercise: Final Report, TECHNOPOLIS, April 20, 2014, see page 22:

• “Only 17% of research funding is institutional (ERAWATCH Country Report, 2011), making Latvia’s one of the most highly ‘contented’ systems in the world. While there is no clear international benchmark for what the proportion of institutional funding should be, there is some consensus that 50% is the minimal viable level. The Finnish Research and Innovation Council recently observed that the share of competitive funding in the university research system has recently approached that value and that to do any further would be dangerous.

• Low relative levels of institutional funding are normally argued to undermine continuity, the ability to invest in facilities and equipment and therefore ultimately quality. A degree of institutional funding stability is also a requirement in order to establish good links with industry. Without this, it is hard to be a credible research partner for the longer term.”
Bricks for Sustainability (survival!!!):

A) Human resources and project task force;
B) International contacts and visibility in ERA;
C) Demanded in various international networks;
D) Upgraded research infrastructure;
E) Real contacts with the community of research driven SMEs in Latvia and abroad;
F) Current National, FP7 and HORIZON 2020 projects and pending applications.
Continuous and persistent participation in various project proposals formed by transnational community of Researchers to contribute to labour market of European Research Area during the years 2012-2017.

In total for Seventh Framework Programme:

- Implementation of 9 retained for financing projects
  (3 coordinated project proposals) total attracted investments 4,5 milj. €;
- Participation in 16 (12 coordinated) FP7 project proposals which received high marks but failed
<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Coordinator</th>
<th>Partnering countries</th>
<th>Duration</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Mercury Observation System, GMOS, Contr. 265113, ENV.2010.4.1.3-2</td>
<td></td>
<td></td>
<td>2012-2016</td>
<td>91,134 €</td>
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<tr>
<td>4.</td>
<td>Development of Nanotechnology Based Biosensors for Agriculture.</td>
<td><strong>FP7-PEOPLES-IRSES</strong> BIOSENSORS-AGRICULT., Nr. 316177</td>
<td>LV, SE, FR, UA, UA, BY</td>
<td>2012-2016</td>
<td>292,600 €</td>
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<td>5.</td>
<td>The Integrated Initiative of European Laser Research Infrastructures III, LASERLAB-EUROPE.</td>
<td></td>
<td></td>
<td>2012-2016</td>
<td>40,500 €</td>
</tr>
</tbody>
</table>
### Financed FP7 projects in the years 2012-2014

<table>
<thead>
<tr>
<th>Project Details</th>
<th>Marked Partnering countries</th>
<th>Duration</th>
<th>Money, €</th>
</tr>
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<tbody>
<tr>
<td>Two projects of BIOPHOTONIC lab at the LU ASI are retained for financing in internal competition of BiophotonicsPlus and will be launched early in 2014.</td>
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## Financed HORIZON 2020 projects in the year 2015

<table>
<thead>
<tr>
<th></th>
<th>Project Details</th>
<th>Partners</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>H2020-SMEINST-2014-1-2-664047-SEMICOOL-H</td>
<td>13,75, retained</td>
<td>2015</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<td>4</td>
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<td>6</td>
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<tr>
<td>Proposals in preparation for the first calls of HORIZON 2020</td>
<td>Partnering countries</td>
<td>Duration</td>
<td>Money, €</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
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<tr>
<td>1. Dr. Roman Viter, Dr. Donats Erts. <strong>Development of metal oxide nanomaterials for sensor applications.</strong> METONANOSENS FP7-PEOPLES-ITN-2013, Nr 607534, resubmitted to FP7, and the third resubmission to Call: H2020-MSCA-ITN-2015, Action: MSCA-ITN-ETN</td>
<td>11 partners FR, FR, LV, 2NL, 3IT, DE, CH, EE</td>
<td>2013-2017</td>
<td>76.20-80</td>
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<tr>
<td>Proposal Number: 675694</td>
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<tr>
<td>5. Janis Alnis, FET Open to HORIZON 2020 call deadline March. 30 call</td>
<td>Resubmitted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Three RISE projects IONS SPECTRA, GEODYNAMIC and BIOSENSORS are pending in submission to the call H2020-MSCA-RISE-2015</td>
<td>Resubmition to call deadline 28.04.2015</td>
<td></td>
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</tbody>
</table>
# Proposals in preparation for the first calls of HORIZON 2020

<table>
<thead>
<tr>
<th>Call</th>
<th>Deadline</th>
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<tbody>
<tr>
<td>7. H2020-WIDESPREAD-2014-2- TWINNIG call</td>
<td>deadline 07.05.2015</td>
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<tr>
<td>8. HORIZON 2020 M-S-C actions IF to call</td>
<td>deadline September 2015.</td>
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<td></td>
<td>Eventually 3-5 proposals</td>
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<td></td>
<td>for repatriated or recruited scientists till 2018</td>
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<td></td>
<td>(Dr.A.Danoss, Dr.K.Mikelsons etc.)</td>
</tr>
</tbody>
</table>
In April 2010, three institutions of the University of Latvia (Atomic Physics and Spectroscopy, Astronomy and Geodesy and Geoinformatics) established the association FOTONIKA-LV with the aim to take responsibility for sustainable advancement of the sector of photonics in Latvia. The association submitted an ambitious FP7 project of basic and applied research in traditional and innovative fields of photonics: REGPOT– 2011-1.
Dr. Hab. Uldis Berzinsh has been repatriated from Sweden to Latvia. He has excellent expertise in basic research and 10 years expertise in research labs in industry. His contribution in the design of mentioned above ion beam instrument GRIBA was substantial and two peer-review publication resulted from his research activities. Unfortunately illness prevented him to be active during the last year of the project;

- Dr. Aigars Ekers repatriated back to Latvia for the second time. He was the first M-C fellow from Latvia and in his first return founded the Laser Center at the University. He was pressed to leave Latvia for the second time during the crises years and was back for year February 1, 2012 to April -2014 and headed the Institute of Atomic Physics and Spectroscopy. Now he is recruited by the Saudi Arabia. He accepted financially very favorable offer facing uncertainty for future and lack of recognition of his contribution to the development of research activities and research infrastructure from the State Authorities, the Ministry of Science and Higher Education and University administration. Facing such attitude his choice is reasonable - having family with four children and wife with Dr degree who was not able to find relevant employment position in Latvia

- Dr. Janis Alnis (having two M-C fellowship grants) was repatriated back from the Max Plank Institute of Quantum Optics in Munich where previously he was associated with the team of Nobel prize winner prof. Theodor Hänsch. Dr. Janis Alnis founded the Quantum Optics Laboratory at FOTONIKA-LV;

- High level technician Janis Blahins was repatriated back from Israel and his contribution to applied research initiatives are impressive;

- An additional four experienced researchers were repatriated: D. Phys. Ilja Fescenko, industrial researcher Dr. Phys Mikelis Svilans(P), planetary scientist Dr. Amara Graps and futurist Vidvuds Beldavs who initiated the International Lunar Decade initiative that is picking up increasing international support. 11 foreign researchers were recruited for the work in FOTONIKA-LV labs from Russia (1), Ukraine (2), Cuba (1), Bulgaria (2), South Africa (1), India (1) and Lithuania (3)
G) Development and upgrade of research infrastructure:

- Upgrade and updates of research infrastructure resulted in restoring experimental capacity and related infrastructure resulted in the creation of new experimental infrastructure for value of 2-3 M€;

- Two observatories - (Astrophysical Observatory in Baldone and Fundamental Geodynamical Observatory of Riga) in real value more than 10 M€.
- The two observatories are members of international networks and provide globally relevant services and during the course of the project were upgraded with instrumentation, renovated physically and returned to regular observations and data supply to relevant international networks.

- Large or specifically targeted purchases of up to date equipment, instrumentation and components allowed to keep leadership in four fundamental research domains and to build advanced instrumentation for negative ion and molecular and ionic cluster research (mentioned above GRIBA) in:

- Strong efforts were made and relevant resources used to restore previously lost basis for industrial oriented research

H) The Public-access Riga Photonics Centre

Ubelis, FOTONIKA-LV/285912, 24.04.2015
• Large or specifically targeted purchases of up to date equipment, instrumentation and components allowed to keep leadership in four fundamental research domains and to build advanced instrumentation for negative ion and molecular and ionic cluster research (*mentioned above* GRIBA) in:
  • Experimental research of sophisticated phenomena in molecular physics using molecular beam instrumentation;
  • Research in quantum optics domain;
  • UV and vacuum UV, spectroscopy targeting basic research on atomic and molecular physics;
  • Ground segment of space technologies and astrophysical research (Renovated and upgraded SLR station. Prototype for new generation of SLR stations designed. Renovated the Baldone wide field Schmidt system type telescope (*one of 10 largest in Europe, largest in Baltic region*).)
  • Advanced Zenith telescope designed combining resources with structural funds project;
  • In future research on negative ions having astrophysical interest and ionic clusters concerning atmosphere physics problems;
  • In future research on negative ions having astrophysical interest and clusters concerning atmosphere physics problems;

Ubelis, FOTONIKA-LV/ 285912, 23.04.2015
Strong efforts were made and relevant resources used to restore previously lost basis for industrial oriented research:

- Electron-beam and resistive evaporation of dielectric, semiconductor and metal;
- Multilayer achromatic optical coating installation - VU-2M with simultaneous photometric layer testing;
- High quality small and cost effective clean room is build for sputtering experiments and for other technology needs;
- Development of inductively coupled plasma technologies for basic and fundamental research;
- Capacity of optomechanical (as well as quartz-glass technologies) workshop restored for the needs of technologically complicated experiments.
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H) The Public-access Riga Photonics Centre is opened, has run programs for schools throughout Latvia and is planning a Year of Light event with the City of Riga in September. The Photonics Center provides support to the SME community with exhibitions, conferences, training events, and consultations on HORIZON 2020 calls specifically targeting the Horizon 2020 SME Instrument but also to other Horizon 2020 programs appropriate for research supporting industry.