



LONG-TERM DEVELOPMENT STRATEGY 2018–2028

HILASE CENTRE
Institute of Physics of
the Czech Academy
of Sciences

UNIQUENESS, USEFULNESS, & CREDIBILITY



Vision Declaration for 2028

Established in 2011, HiLASE has grown into an extraordinary technological infrastructure in the field of application-oriented laser research. We offer innovative laser solutions where commonly deployed ones are not sufficient. Since 2016, the HiLASE facility is fully operational and now it is an appropriate time to reflect and lay out our vision for the future.

Under one roof at HiLASE we develop the next generation of high power Diode Pumped Solid State Lasers, while at the same time, exploit these unique light sources for a wide range of hi-tech industrial applications such as Laser Shock Peening, Laser Induced Damage Threshold testing, and Laser Micro-Machining. Our most important facilities include the world record-breaking superlaser "Bivoj", delivering over 1 kW of average power, and the compact picosecond thin-disk laser platform "PERLA" delivering high power laser beams at wavelengths from mid-infrared to deep ultraviolet. There are limited number of institutes in the world pursuing that frontier.

Our big supporter and friend, Prof. Robert Byer from Stanford, always says: "One should never undertake a project unless it is manifestly important and nearly impossible". His statement held very true during the implementation phase of HiLASE, as despite many challenges, we ended up with a timely commissioning of the facility in line with the original plan. In 2016, we celebrated the conquest of Terra Incognita by breaking the 1-kW barrier. But HiLASE does not want to be satisfied with this success; we shall continue to move toward a new vision and our next dream.

We have an excellent international team of researchers and engineers, and I strongly believe that one of the keys to our success is **people**. Attracting talented students and creative researchers is crucial. They are the glue that allows things to happen because technology itself does not get automatically transferred by a piece of paper called a patent. Technology gets transferred only by insightful people.

We built up a solid collaboration network across the globe. I am glad to see that HiLASE became self-confident and does

not have a second tier function but often acts as key technology developer. Therefore, HiLASE today is in a good position to become one of the research and technology leaders in the laser field of Europe, and globally in the next years to come.

Our next task is to build a strong relationship with industry and transform our advanced lasers from laboratory prototypes to real products. HiLASE re-embarks on a new journey towards the Centre of Excellence by putting the scientific curiosity to the use of society. In doing this we are building on the long history of our leading national expertise in highly technical disciplines and working towards returning the Bohemian Lion to the position of the pre-war Czechoslovakia, at the forefront of the technological powers. Indeed, this is a very challenging and long-term mission, but as President John F. Kennedy said: *"We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard"*.

For the past 12 months we have gone through many brainstorming discussions as well as the consensus building process, thereby building a supportive culture embracing our team members and finally reaching a shared vision for HiLASE presented here.

The DNA of HiLASE is composed of the three main virtues: *Uniqueness, Usefulness, and Credibility*. Therefore, members of HiLASE are expected to push the frontier of laser technology beyond its current limits, serve as a bridge between the academic world and Industry, and be a reliable partner in doing so. These virtues embody our mission slogan of *"Superlasers for the Real World"*.



Tomáš Mocek, Dr.
Head of the HiLASE Centre

**MISSION 2028 SUPERLASERS FOR
THE REAL WORLD**

**VISION 2028 BE A LEADING
R&D CENTRE THAT PROVIDES
INNOVATIVE LASER TECHNOLOGIES
AND SOLUTIONS OF DIRECT BENEFIT
TO ECONOMY AND SOCIETY BY
CONNECTING SCIENTIFIC EXCELLENCE
WITH INDUSTRIAL DEMANDS.**

THE LONG-TERM VISION WILL BE REALIZED THROUGH FOUR STRATEGIC PRIORITY AXIS



Top Class Research



Real World Applications



Illuminating Science



Synergy and Cooperation

Priority Axis 1 – Top Class Research

GOAL REACH SCIENTIFIC EXCELLENCE THAT ENABLES INNOVATIVE SOLUTIONS



Objectives

- Attracting outstanding researchers, students, and different groups of users
- Expansion of multidisciplinary research
- Creation of the knowledge base on challenges of society, science and the economy
- Promoting collaborative research through the effective use of the facility
- Strengthening research with the balance between curiosity-driven and application-lead research

Measure of Success

- Annual Evaluation of the research performance and results – qualitative and quantitative measures of success
 - Number of publications in high impact scientific journals
 - Number of open access users
 - Number of collaborative research projects
 - Number of post-doctoral fellows at the Centre

HiLASE Centre stands for top-class research on an international level. We put emphasis on an active policy combining excellence in fundamental research with technological developments to produce knowledge and innovation. Our curiosity is driven by necessity.

We are aiming to build a climate of creativity and learning within the workplace, fostering innovative ways of working enabling us to take maximum advantage of new opportunities.

Therefore, it is crucial to attract top researchers and brightest students. A critical mass of leading research staff and outstanding students will support international reputation of HiLASE and produce rich research outputs in the atmosphere of intellectual cooperation and mutual respect. Our strategy focuses on broadening and supporting interdisciplinary research with advanced laser sources in the fields of chemistry, biology, medicine, environmental science, etc. It will provide integration of data,

methodologies, and concepts from multiple disciplines that enable advancing fundamental understanding and solving real world problems.

We will also create and utilize an effective user-friendly system for the access to the HiLASE infrastructure. It will support strong academic and industrial partnerships at the national and international levels.

Priority Axis 2 – Real World Applications

GOAL BENEFIT AND ADD VALUE TO THE HIGH-TECH INDUSTRY AND SOCIETY

The HiLASE Centre provides innovative laser technologies and solutions of direct benefit to economy and society by connecting the scientific excellence and industrial demands in the Czech Republic and across Europe. In the long term, it will increase the economic prosperity of the country, as well as benefit society. This requires visionary leadership and efficient internal communication. Therefore we will be opened to all relevant demands and be ready to maximize the opportunities for sharing the knowledge, skills, ideas and expertise arising across the activities of HiLASE activities.

HiLASE has various expertise relevant to hi-tech industry, which benefit from the sequential nature of innovative business. We combine the ability of predictive modeling of intense laser-matter interaction together with the capability of the building the right lasers capable of producing these interactions. This, in conjunction with constant vigilance of the requirements of industry, fortifies the position of HiLASE to be a main contender for breakthrough projects with mutually suitable partners. By investing into in-house R&D, we generate knowledge in the field of laser technologies as a new national asset.

Evolution of the business strategy of HiLASE must be established in order to sustain world class research and technologies born within that research. Successful business models rely on profitably delivering value to customers for a reasonable price. By establishing the feedback between business demands and research direction, we will strengthen connection and maintain mutual benefit.



Objectives

- Establishing HiLASE as a world class source of innovative technology
- Forming and undertaking large-scale projects with partners
- Development of viable business models for local and global photonic-related industries
- Building and expanding the economic impact of the HiLASE centre

Measure of Success

- Number of commercial cooperation and contract research projects
- Ability to generate new ideas with commercial potential (patents, prototypes, utility models)
- Number of proof concept trials with industrial participation
- Volume of contract research revenues
- Increased ratio of non-public revenues on total running cost of HiLASE Centre



Priority Axis 3 – Illuminating science

GOAL INSPIRE AND INVOLVE BROAD PUBLIC WITH EMPHASIS ON MOTIVATING YOUNG TALENTS

Objectives

- Stimulating and responding to public interest in research and its outcomes
- Developing new programmes and activities for different groups of audience
- Raising public awareness about the HiLASE research
- Explaining the benefits of the research for the society
- Supporting and developing young talents

Measure of Success

- Target group experience surveys
- Number of participants in the HiLASE Centre educational activities
- Number of students (MA, PhD) accessing the Centre
- Portfolio of educational activities for different audience
- New media channels

We are committed to reaching out to the public, especially the young, to enthuse and inspire them about science, technology, engineering and physics, and to encourage them to pursue careers in these disciplines. Youth programs covering the whole educational spectrum are an important part of our efforts to inspire young talent, and have been implemented over a period of last years.

Very important goal is to create closer partnerships with Czech and international universities, which prepare specialists in

photonics, laser physics, plasma, material science and other disciplines related to the HiLASE activity. Increasing direct involvement of the university students in the research process will improve the standard of training, core competencies and marketable skills required on the practical side.

It is crucial to raise public awareness and public understanding of research and innovations developed at the HiLASE Centre. For these aims, various means will be used (Open days, public lectures, Internet resources, etc.) to

disseminate information about breakthrough achievements and examples of good practice as well as about their importance for economic growth and employment.

To succeed, it is very important to come with modern and interactive programs and activities across the audience groups. It is necessary to work more efficiently with new media, creative and artistic industries, and offer hands-on experiences to young people.

Priority Axis 4 – Synergy and Cooperation

GOAL BUILD AND STRENGTHEN ENGAGEMENT OF HiLASE ON LOCAL AS WELL AS GLOBAL LEVEL

HiLASE should in the future even more serve as a bridge between science and industry and is thus instrumental in shaping innovation. Therefore, HiLASE cooperates extensively with strategic partners from the scientific, academic and industrial sphere. The main goal is the creation of networks and collaborative partnerships which accelerate the transfer of research findings into specific applications and inspire new business ideas or even new

companies. We will continue in the future to build our international portfolio of strategic partnerships with research centres, universities and industry. We will work with local and national authorities, innovative supporters and other stakeholders to meet the common goals. We shall think globally but act locally.

Future development of the HiLASE Centre is not an isolated activity. The Centre is perfectly

located in a new and dynamically developing region STAR (Science and Technology Advanced region), i.e. the cluster including all key innovative infrastructures and hi-tech companies of the region with huge potential to increase the competitiveness of the region and wellbeing of its people. The emphasis will be put on active participation in further development of the existing regional cluster formation STAR providing an innovation friendly environment.



Objectives

- Setting up HiLASE to be a technological cornerstone for the local region
- Developing the regional cluster formation
- Establishing strong and effective strategic partnerships with key research organizations on international level.
- Establishing efficient partnership with the industry and transferring results of the research into specific applications

Measure of Success

- Increased portfolio of strategic partners
- Number of common projects and cooperation with research organizations and industry
- Number of participations in programs of international cooperation
- Volume of financial resources from national and international competitive public funding

STRATEGIC ENABLERS TO REACH THE GOALS OF THE STRATEGY

People

We realize that the contribution of highly skilled people is crucial for the success of the centre. Therefore we aim to attract top researchers and the brightest students, to give them academic freedom, to create the atmosphere of intellectual cooperation and mutual respect. We provide the appropriate training and working environment for scientists as well as for a variety of technical and administrative professions.

Infrastructure

HILASE Centre disposes of very unique infrastructure. To reach all the strategic goals it is absolutely essential to further upgrade the current technologies and equipment. Right people and sufficient amount of financial sources are in direct connection with securing of this enabler.

Finance

Strong financial base is the key enabler for reaching of the strategic goals. Therefore, it is crucial to decrease our dependency on public funding. We will focus on diversification of financial sources with the emphasis on commercial funding. We will concentrate on attracting funding from business partners and long-term cooperation projects to support delivery of our strategic goals.

Management

The management structure, accountabilities, processes etc. should represent an appropriate balance between effective management, productivity of the team and successful engagement with the community of stakeholders. We will continue to develop and implement organizational system and processes to improve our daily activities, to create motivating conditions for the employees, to secure financial stability. Emphasis will be put on effective and correct internal and external communication.



Dolní Břežany, Czech Republic

LOCATION OF HiLASE CENTRE



MEMBER OF
STAR

HiLASE is an active member of STAR
Research & Innovation Cluster

Science
State-Of-The-Art Science, Key Research Institutions

Technology
Top Class Technologies with Significant Application Potential

Advanced
Services and Infrastructure for Innovative Enterprises

Region
In the Direct Vicinity of Prague, Easily Accessible

www.star-cluster.cz





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