Design, experiences and opportunities of cloud based medical devices enabling improvement of treatment efficacy by analytics.
PERSONALIZED MEDICINE AND BETTER LIFE

- Exclusive supplier to 10+ pharma, other Fortune 500 companies & well-known cancer centers
- 20+ years track record of semiconductor lasers & optics (400–2000 nm) for medical and high value-add applications
- Listed in NASDAQ First North

Life sciences
- Oncology
- Ophthalmology
- Genetics & diagnostics

Other high value-add applications
- Quantum computing
- Communications
- Digital press
- Weather monitoring
- AR/VR
- Environment & sensing

Services
- Data analytics & Cloud for improving treatment efficacy
- Pay-per-use (new indications)
- On-site/online training and annual calibration
- Lifecycle support with recurring service plans
- Regulatory design & approvals
- Regulatory and feature software updates
Motivation & market drivers

1. Various treatment modalities call for different laser systems and light delivery technologies.

2. Growing number of imaging dyes call for wide range of wavelength options and optical power → need for flexible configurable platforms.

3. Desire to combine diagnostic and therapeutic processes into one theranostic treatment flow.

4. Real-time treatment monitoring and analytics guide the treatment towards better outcome.

5. Standard protocols & interfaces to enable fluent interplay with hospital environment and cloud-based analytics.
Large underlying market opportunity

**Aging population** fueling the need for better and complementary therapies

- **120%** growth in the number of persons aged over 65 years old by 2050\(^1\)

- **~EUR 150bn** global oncology market estimated to grow at a CAGR of **11%**\(^2\)

**Combination therapies and personalized medicine** becoming more standard care in oncology

- Cancer drugs ineffective for **75%** of patients\(^3\)

- Personalized medicine accounts for more than a third of new FDA drug approvals\(^4\)

**Drive for scalable cloud-connected treatment solutions**

- **~EUR 100bn** global digital health R&D market estimated to grow at a CAGR of **8%**\(^5\)

- **~EUR 46bn** global mobile health market estimated to grow at CAGR of >30%\(^6\)

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Average survival of glioblastoma patients is 12-15 months with the current standard of care (SOC)
- SOC increases the mean survival only by a few months and doesn’t bring curative solutions
- Is limited by systemic toxicity and damage to normal brain
- Complete resection is rarely feasible because of the safety margin

High recurrence of GBM despite treatment
- Recurrence nearly universal within 2 years of diagnosis, average time to recurrence only 6-7 months

Tumor resistance (inherent or acquired) to therapy
- Blood-brain and blood-tumor barriers restrict the effective transport of most drugs to the tumor
- Mutations in drug resistance pathways, resistant glioma stem cells, expression of MGMT etc.

→ New treatment options needed
Modulight solution example for glioblastoma

REAL-TIME TREATMENT MONITORING & CLOUD ANALYTICS

0. Treatment protocol planning in cloud.modulight.com

1. Protocols obtained from cloud

2. Treatment run on selected protocol

3. Treatment data uploaded to cloud and feedback received from cloud

CONFIGURABLE MEDICAL LASER PLATFORM

- Proven & certified ML7710 design
- Scalable and configurable optical delivery and monitoring channels
- Configurable wavelength 400–2000 nm
- Support for all major photosensitizers and dyes
- Configurable to different modalities, treatment, imaging, diagnostics etc.

TREATMENT MONITORING AND CLOUD BASED ANALYTICS

- Minimally invasive combined illumination and measurement probes
- Simultaneous illumination and multi-channel measurement
- Automated real-time monitoring and data-collection
- Centralized data analytics for real-time feedback and post Tx efficacy improvement
Example treatment flow-GBM

Theranostic treatment and monitoring process can be integrated into the existing clinical workflows.

Seamless integration of photoimmunotherapy & drug delivery with the surgery and pre/post-operative imaging.

Possibility also for optical biopsy.
Modulight Cloud and analytics

- All Modulight medical devices are cloud-connected
- Goal to improve treatment efficacy
- Automatic data upload for real-time monitoring and analysis
- Modulight cloud enables storage, management, analysis and downloading monitoring data that is collected during treatments
- All data is linked to the particular treatment which allows for combining to other clinical data for complex analysis
- Connectivity enables remote support and technical diagnostics for improved usability and user experience
Major ophthalmic diseases affecting the eye posterior (AMD, DME, glaucoma) are becoming more prevalent with aging population.

There is a need for novel ophthalmic laser technology that offers versatile and up-to-date treatment control and monitoring possibilities for above diseases.

Modulight cloud-connected ophthalmic laser platform consists of laser system controlled with an iOS app and optical beam shaping unit.

Cloud and iOS based platform offer unique service offering and user experience.
Modulight Cloud features

- Anonymous storage of all planned and realized treatment parameters
- Machine learning (ML) and artificial intelligence (AI) based treatment planning from previously uploaded data
- Analysis of intraoperative monitoring and diagnostic data, such as ocular image and fluorescence data
- Additional features enabled by cloud and internet connectivity include
  - Easy switch of UI/treatment protocol per indication
  - User authentication, real-time support chat, personal settings, treatment history, automatic software updates, user training videos
PERSONALIZED EXPERIENCE

Medical devices can be daily tools for healthcare professionals. Two things matter the most:

Safety
- User authentication
- Real-time personal contact channel directly to Modulight support
- Automatic SW updates

Efficiency
- Adapt the device to your needs
- Intuitive and mobile user interface
- Treatment history view

Modulight ML6710i Laser has received praising usability feedback from ophthalmologists. Especially the iPad user interface is seen very intuitive and fluent to use. Not to mention “high style points” of the design.
Key aspects for future medical lasers

1. Multi-indication platforms to support upcoming drugs/dyes
2. Cloud connectivity for treatment planning, monitoring and analytics
3. Real-time optical treatment monitoring and dosimetry
4. Solutions to support entire treatment development process from discovery to clinical phase
5. Future combination of treatment, imaging and diagnosis of photoactivated drug delivery process
Thank you!

modulight

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