TripleRing

Intra-Operative Tissue Pathology

BLACKLIGHT SURGICAL

Client
BlackLight Surgical

Practice Areas
Advanced Imaging
Robotic & Radiotherapy
Physics-Based AI
Advanced Technologies & AI

Core Disciplines
Software Engineering
AI & Advanced Algorithms
Mechanical Engineering
Systems Engineering
Transfer to Manufacture
Electrical Engineering
Industrial Design
Optical Science
Photonics & Imaging
Quality System Management
Embedded Systems

Challenge

BlackLight Surgical needed a high-speed biochemical imaging platform capable of analyzing tissue in real time during surgery — requiring precise integration of advanced optical, mechanical, software, and machine learning systems into a clinically deployable architecture. The system also needed to meet ISO 13485 medical device standards and perform reliably across demanding operating suite environments.

Solution

Triple Ring assembled multidisciplinary engineering and scientific teams to design and integrate the imaging platform using structured development and validation methodologies. High-speed picosecond pulsing laser technology was integrated with machine learning workflows for real-time tissue interpretation, while modeling and simulation guided requirements development. Quality management processes were established to ISO 13485 standards and documented within a Quality Management System transferable to BlackLight Surgical.

Client Impact

- Delivered a fully integrated intra-operative biochemical imaging platform supporting clinical studies
- Enabled real-time tissue visualization and differentiation between normal and diseased tissue in the OR
- Developed and transferred a complete ISO 13485-compliant Quality Management System to BlackLight Surgical
- Established the technical foundation for next-generation intra-operative pathology workflows

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