TripleRing

Robotic Radiation Therapy

EMPYREAN MEDICAL SYSTEMS

Client
Empyrean

Practice Areas
Advanced Imaging
Smart Medical Devices

Core Disciplines
Mechanical Engineering
Systems Engineering
Industrial Design
Photonics & Imaging
Quality System Management
Applied Physics

Challenge

Empyrean Medical Systems needed a compact, mobile radiation therapy system capable of delivering precisely directed low-energy radiation during surgical procedures — requiring integration of custom x-ray sources, beam steering electronics, and robotic positioning components into a clinically operable platform. The development effort also required preparation of a complete regulatory submission package supporting FDA 510(k) clearance.

Solution

Triple Ring collaborated with Empyrean across the full product development lifecycle, from concept generation through system integration, clinical validation, and manufacturing transfer. Custom x-ray source technology was developed to support true 3D beam directionality, while advanced Monte Carlo simulations guided performance optimization. Robotic guidance and radiation delivery subsystems were integrated into a unified platform, with verification, validation, and clinical testing executed to support regulatory submission.

Client Impact

- Delivered a fully integrated, clinically validated intra-operative radiation therapy system submitted for FDA 510(k) clearance
- Achieved successful manufacturing transfer and market launch following regulatory submission
- Enabled true 3D beam directionality in a compact, mobile surgical environment platform
- Advanced intra-operative radiotherapy capabilities and supported commercialization of a first-in-class robotic radiation delivery system

Find more case studies on our website: