

ProBeam® 360° Proton Therapy System

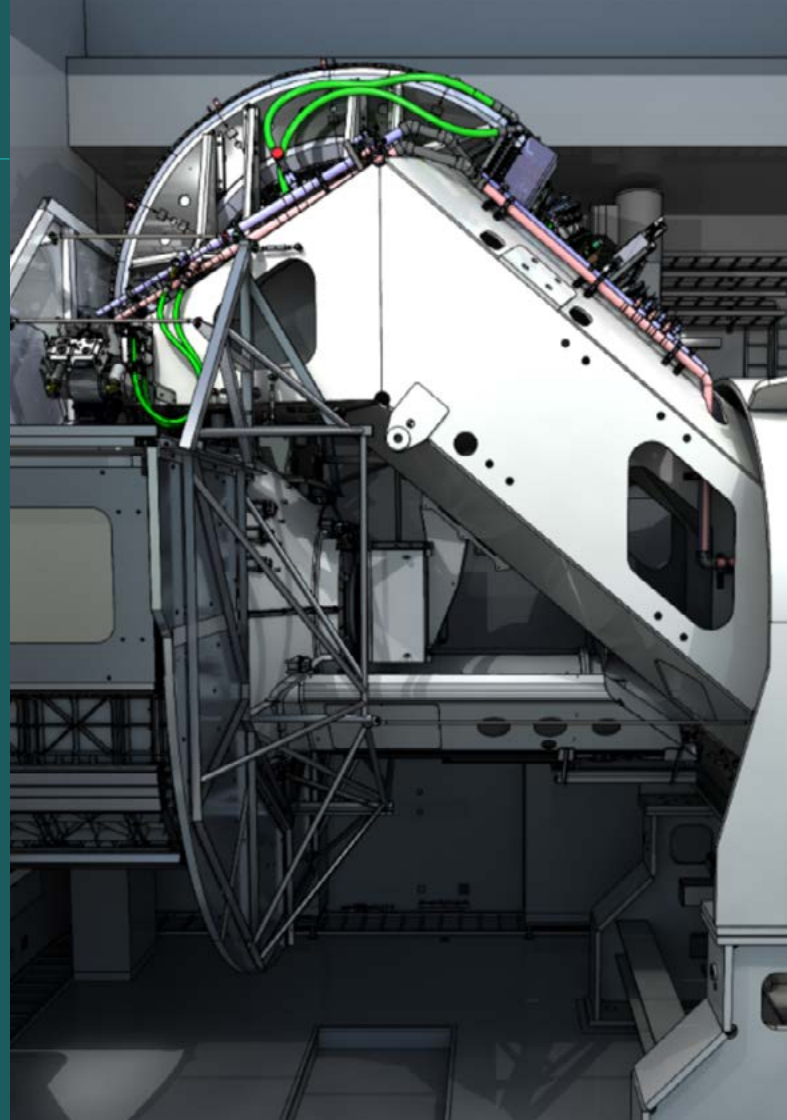


Varian, a Siemens Healthineers company

Design and engineer of ProBeam gantry electro-mechanical hardware.

Expertise and domain knowledge

- Medical product risk management
- Medical design history file creation and maintenance
- Concept development and selection
- Cost modelling and reduction
- Mechanical, electrical and industrial design
- Design for manufacture, assembly, installation and maintenance
- Simulation and numerical analysis





Our client asked:

Proton therapy is used to treat complex cancer cases, but beam physics mean that the machines that deliver the proton beam to the patient (known as gantries) are physically large and complex, with exacting requirements on stiffness and positional accuracy. This means that buildings must be large, which can prohibit location in population centres.

Varian asked Sagentia Innovation to design and engineer ProBeam gantry electro-mechanical hardware that was physically smaller, allowing installation in a smaller building, while being less costly to fabricate, populate with electromagnets and electronics, ship, install and maintain.

Results: deliverables and outcomes

Sagentia Innovation delivered a detailed design for the new gantry's electro-mechanical hardware, along with simulation and analysis results, risk analyses, and a medical device design history file to support Varian's subsequent regulatory submission.

Varian installed the world's first ProBeam® 360° proton therapy system at Penn Medicine Lancaster General Health's Ann B. Barshinger Cancer Institute, and multiple units are now being installed around the world. Varian received 510(k) approval for its ProBeam® 360° in December 2022.

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The project story:

Sagentia Innovation led the development to make the ProBeam® 360° gantry structure concept a reality, working collaboratively with the Varian team throughout the project. Our programme of work included:

- Assessing Varian's own compact gantry structure concepts for manufacturing and installation risks and costs, and benchmarking against key competitors
- Designing and running a joint workshop to generate a gantry structure concept, which was then evolved into the ProBeam® 360° gantry and moving floor structure designs
- Detailed mechanical and electrical design, including extensive simulation and numerical analyses to develop a safe, efficient and cost-effective design
- Industrial design to develop detailed designs for patient-facing covers, treatment room layout, lighting and logos
- De-risking through prototyping and testing of critical electro-mechanical subsystems
- Redesigning electrical control cabinets to rationalise and reduce space occupied
- Assisting the building design, including the generation of building information models
- Devising assembly, handling, installation and shipping tools in lockstep with the design process
- Supporting the first prototype manufacturing, assembly and test programme