

## Simulation of Radiation Sterilization: Choosing the Best Packing Configuration

For cost reduction, it is beneficial to choose a packing configuration that allows for the highest throughput. Typically, the ideal arrangement is found through experimental trial-and-error. In addition to being expensive and time-consuming, such an approach might miss the packing configuration that finds the perfect balance between throughput and sterility.

### Triple Ring Technologies

Triple Ring Technologies, headquartered in Newark, CA, is an ISO 13485 certified innovative R&D company that partners with clients to deliver complex technical solutions. Founded in 2004, Triple Ring's team of scientists and engineers provides leading edge, integrated technical design, engineering, and business services. Clients include entrepreneurs, established companies, and investors in the medical device, life sciences, optics, clean technology, and digital imaging fields.

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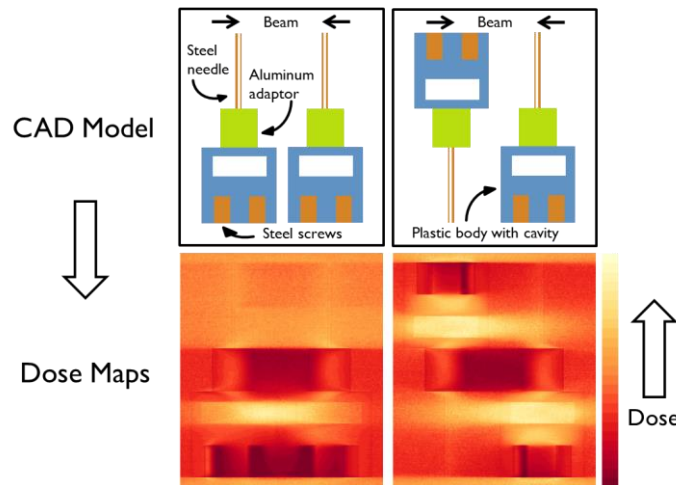
### Steri-Tek

Steri-Tek, opening in April 2016, will be a high-volume E-beam/X-ray contract sterilizer and R&D innovation center that provides on-demand sterilization, microbiology, crosslinking, and expert consultative services to the medical device, biotech, pharmaceutical and other industries. Particularly with sensitive products, Steri-Tek has developed a proprietary system for radiation-sensitive materials such as combination devices, bioabsorbables, implantables, advanced polymers and other complex products. Steri-Tek will be an ISO 13485 and ISO 11137 certified facility that will be FDA registered and DEA licensed, bringing over 75 years of combined medical device, biopharma and sterilization expertise to its customers.

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### Our solution

The process of choosing the ideal packing configuration can be guided by testing any potential packing configuration *in silico*, which removes the need to perform time- and cost-consuming sterilization measurements. To do so, powerful computer simulations can be used to estimate the dose distribution received by the product.



The power of this approach is demonstrated in the figure above, which shows the simulated dose distribution of a prototypical medical device phantom packed with the devices in the same orientation or in alternating orientations. The relative placement of the devices has a large impact on the dose distribution, and this effect can be systematically and efficiently studied using simulations.

### How do we do it?

Triple Ring Technologies has developed a powerful software tool capable of realistic simulations of radiation sterilization. The physics in the simulations is powered by the GEANT4 toolbox; developed at CERN, GEANT4 is the most sophisticated and accurate physics library in existence. Our tool can simulate the full three-dimensional dose distribution received by any product from gamma, electron-beam, or x-ray sources.