

# Monte Carlo Dose Calculation

## Optional Dose Calculation Algorithm Seamlessly Integrated into the MultiPlan® Treatment Planning System

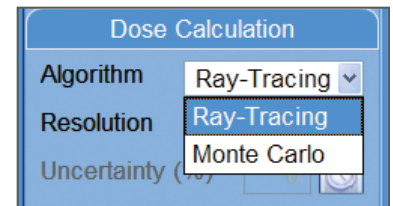
Accurate dose calculation is essential to generating high quality treatment plans for patients who receive radiosurgery treatments. Of the various dose calculation methods available, the Monte Carlo method is widely recognized as the most highly accurate and is often referred to as the “gold standard” in radiation dose calculation.

### Planning Flexibility Enhanced

The Monte Carlo Dose Calculation feature implemented in the MultiPlan® Treatment Planning System was developed in collaboration with expert clinical partners. This feature not only provides the most accurate radiation dose calculation method available, but does so within time periods equivalent to other dose calculation methods.

Clinical users have reported that the calculation of treatment plans using the Monte Carlo Dose Calculation in the MultiPlan System does not compromise planning efficiency, and in fact use of the Monte Carlo Dose Calculation option fits effortlessly into the existing planning workflow and timeframe.

By itself, the Monte Carlo Dose Calculation feature in the MultiPlan System provides one of the most unique planning tools available for radiosurgery treatment planning. When combined with other CyberKnife® System options, such as 4D Treatment Optimization and Planning, Sequential Optimization, and the Iris™ Variable Aperture Collimator, the CyberKnife System provides the most flexible, most powerful radiosurgery planning and treatment tools available to the market today.



### The Basic Principle

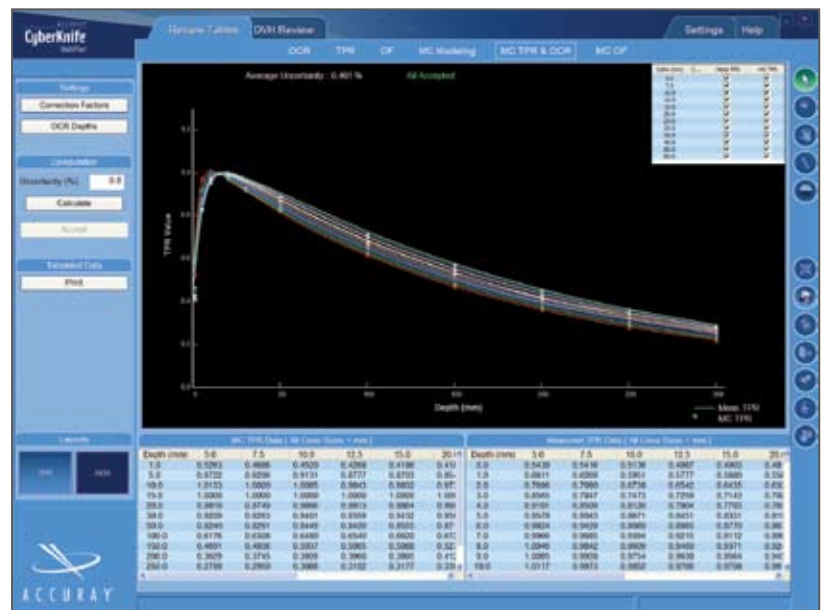
A virtual source model is used by the treatment planning system to accurately calculate the dose to not only the treatment target, but to the entire patient anatomy. This is accomplished by using the source model data to calculate the dose delivered by each of the several million photons that make up each of the hundreds of treatment beams delivered by the CyberKnife Robotic Radiosurgery System. The efficient design of the CyberKnife System LINAC head and the enhanced computing power of the MultiPlan System workstation combine to make these millions of calculations possible within a clinically acceptable few minutes.

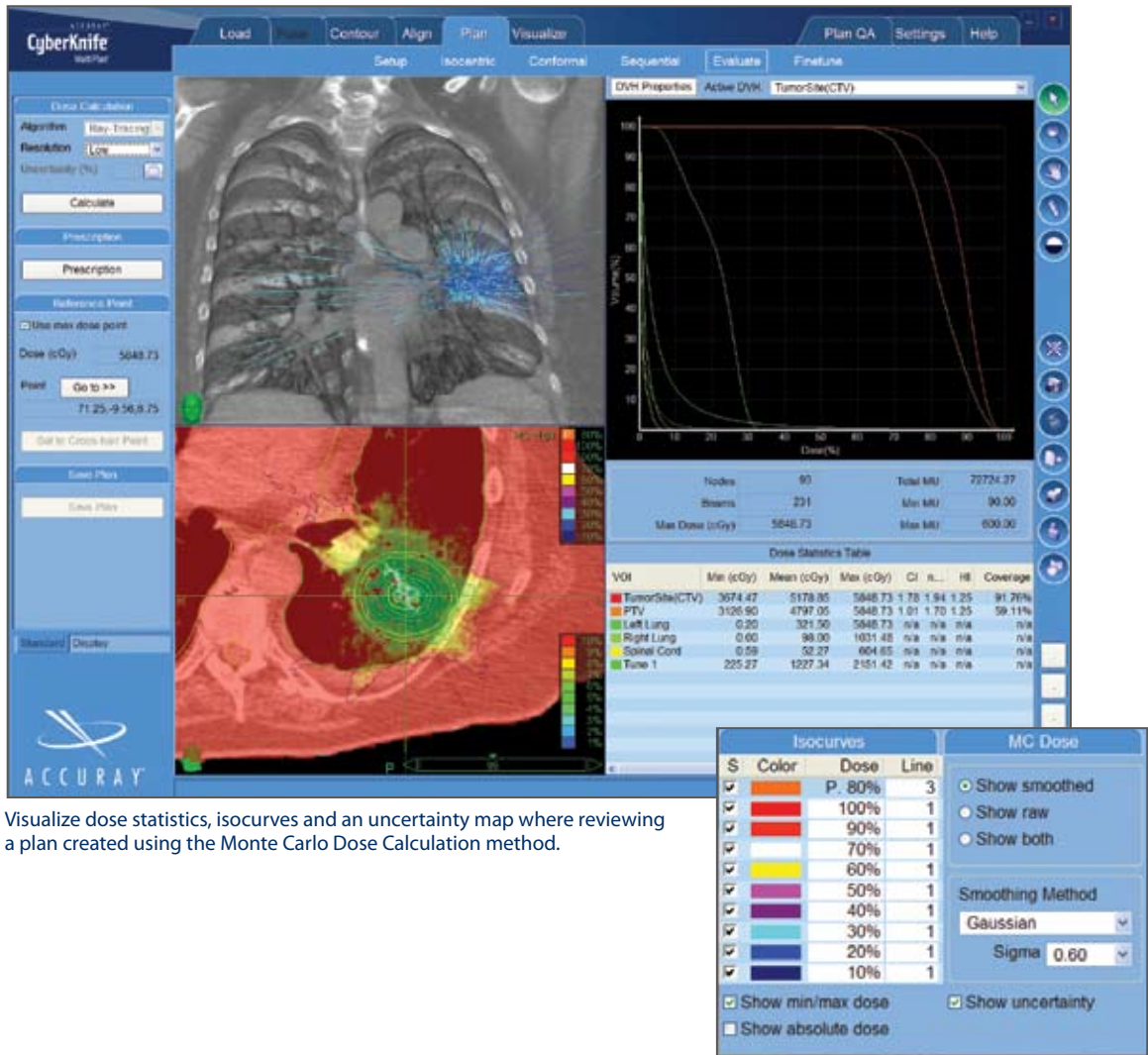
### Monte Carlo Commissioning

The MultiPlan System provides a straightforward method for commissioning the Monte Carlo Dose Calculation algorithm. The result of the commissioning process is the virtual source model – consisting of a source distribution, a fluence distribution and an energy spectrum – generated from data measured from your LINAC.

### Clinical Applications

The most significant clinical advantage of using a Monte Carlo method to calculate dose is demonstrated when the treatment target is in or near the lung. However, the Monte Carlo Dose Calculation feature in the MultiPlan System can be used to calculate dose to any treatment target anywhere in the body. For instance, clinicians have used the Monte Carlo Dose Calculation to accurately calculate dose to targets not only in the lung, but also those in the head and neck region, especially when in close proximity to air cavities and sinuses.





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