

## Annotated Bibliography

Carl, G., Reitz, D., Schönecker, S., Pazos, M., Freislederer, P., Reiner, M., Alongi, F., Niyazi, M., Ganswindt, U., Belka, C., & Corradini, S. (2018). Optical surface scanning for patient positioning in radiation therapy: A prospective analysis of 1902 fractions. <https://doi.org/10.1177/1533033818806002>

This research article discussed the reproducibility advantages of the optical surface monitoring system. The article compared and evaluated setup errors of the Catalyst HD (C-Rad AB) optical surface scanner between 110 different patients. The conclusion of the investigation proved that the optical surface scanner positioning system is efficient, reliable, and feasible for patient positioning of many different treatment areas. There are many other advantages of the optical surface monitoring system stated in the article which is helpful when comparing to the traditional triangular positioning technique. The article also has useful images that show the positional deviations on the patients' surface as well as the tolerance limits to the reference scan that provides a useful visual of patient set up.

Dekker, J., Wagenberg, T. P., Smet, M., Essers, M., Kusters, M., & Kruijf, W. (2021).

Geometrical analysis for motion monitoring of rigid bodies with optical surface scanning in radiation oncology. *Physics and Imaging in Radiation Oncology*, 20, 105-110. [10.1016/j.phro.2021.11.006](https://doi.org/10.1016/j.phro.2021.11.006)

The authors of this article provided a very in-depth description of how the surface monitoring system works, which is very useful for this type of project. This article is convenient for descriptions and offers many examples of common set up variations that can cause issues with positioning for both triangular and optical surface positioning.

This is a good source for comparison and description purposes. This article also states many different advantages of the surface monitoring system such as reproducibility, real-time monitoring, and patient comfort. This article has the most information on intra-fraction motion and correcting posture deviations.

Naumann, P., Batista, V., Farnia, B., Fischer, J., Liermann, J., Tonndorf-Martini, E., Rhein, B., & Debus, J. (2020). Feasibility of optical surface-guidance for position verification and monitoring of stereotactic body radiotherapy in deep-inspiration breath-hold. *Frontiers in Oncology, 10*.

<https://www.frontiersin.org/journals/oncology/articles/10.3389/fonc.2020.573279/full>

This research article presented statistical data to confirm the position improvements made by the surface guided radiotherapy when compared to the triangular room laser localization. This is a good source as statistical data allows for data comparisons between the two positioning techniques. This article also discussed the benefits of the surface monitoring system with treatments utilizing deep inspiration breath hold techniques. An image is included in the article showing a screenshot of the SGRT region of interest on the patient including deep inspiration breath hold monitoring. The article also includes a workflow image showing the process of patient treatment planing starting from simulation to the treatment development.

Nutt, J. (2023). Effect of surface-guided radiation therapy on radiation therapy imaging.

*Radiation Therapist, 32(2), 96-103.*

[https://media.asrt.org/pdf/publications/RTT/RTT\\_Vol32\\_No2.pdf](https://media.asrt.org/pdf/publications/RTT/RTT_Vol32_No2.pdf)

Radiation Therapist is a great source for this project as it is a peer reviewed journal and uses other reliable sources and studies. This specific article relates the effectiveness of

surface guided radiotherapy to the traditional triangular positioning. This is the most detailed article and provides the most descriptions, comparisons, and advantages of the optical surface monitoring system. This article describes how the equipment works and describes the benefits of having real-time monitoring. This article is a great source for equipment descriptions for the intro and provides many examples for comparisons and benefits between the two techniques. Traditional triangular localization is also discussed in great depth that helps provide background information for the project.

Song, Y., Zhai, X., Liang, Y., Zeng, C., Mueller, B., & Li, G. (2022). Evidence-based region of interest (ROI) definition for surface-guided radiotherapy (SGRT) of abdominal cancers using deep-inspiration breath-hold (DIBH). *Journal of Applied Clinical Medical Physics*, 23(11). <https://doi.org/10.1002%2Facm2.13748>

This article discusses the improvements in treatment set-up time, accuracy, and patient comfort. The authors describe that surface guided radiotherapy improves patient care and could potentially replace tattoo markings. Clinical procedures described in the article demonstrate the accuracy in treatment dose and patient safety. The other advantages of surface guided radiotherapy include eliminating tattoos, providing a larger field of view for patient setup, and reduction in radiation exposure. This article also mentioned respiratory monitoring in a broad topic rather than just deep inspiration breath hold techniques.

Swinnen, A., Ollers, M. C., Ong, C. L., & Verhaegen, F. (2020). The potential of an optical surface tracking system in non-coplanar single isocenter treatments of multiple brain metastases. *Journal of Applied Clinical Medical Physics*, 21(6), 63-72.  
<https://doi.org/10.1002/acm2.12866>

This article was more focused on a single treatment for brain metastases using an optical surface tracking system. This article was interesting in that it was set up in a step by step description that showed the process of using the surface tracking system. The authors evaluated the accuracy and efficiency of using this system in a clinical setting. What was interesting about this article was that it presented a disadvantage to the optical surface monitoring system which was not mentioned in previous articles. This article is also going to be used for reference images demonstrating the equipment and camera alignment.

Washington, C. M., Leaver, D., & Trad, M. (2021). *Washington and leaver's principles and practice of radiation therapy* (5<sup>th</sup> ed.). Elsevier.

This book provides textual definitions and descriptions of the surface tracking equipment and software. The gantry, imaging arms and other components of the equipment were best described in this source. This book also discussed the types of treatments that can be conducted using the surface monitoring system and different studies done demonstrating it's accuracy and efficiency. However, this book is very broad giving an overview of all aspects of radiation therapy and is not very specific for surface guided radiotherapy.