

AbstractID: 11645 Title: Performance comparison of an in-house and a commercially available amplitude gating device for PET imaging

Objective: To compare the performance characteristics of an in-house amplitude gating device to the Anzai respiratory gating system in PET imaging. **Methods:** A MLT-1132 respiration transducer was coupled to a cDAQ-9172 data-acquisition device to digitize the respiratory signal. A Labview[®] program was designed to inject triggers into PET List streams whenever the respiration amplitude crossed the edges of a user-set amplitude-range (gate) and stop the scan when the accumulated gated scan-duration reached a user-set interval. To test its performance, a phantom containing one stationary (33mm) and 2 moving spheres (33&17mm) was imaged in 3D mode on a GE-DRX PET/CT scanner (SBR=5.1). The two moving spheres were attached to a moving platform (2cm-pp-sinusoid, 5sec-cycle) while the MLT-1132 and Anzai transducers were secured to the platform simultaneously. Respiration signals from the two transducers were synchronized using triggers from the Anzai device. The gated amplitude-range and scan-duration were 80-100% of the motion amplitude and 3min respectively which resulted in 10min of total scan-duration. The List data was first filtered by only keeping data within the gate and then reconstructed (3D-IR) to generate a MLT-1132-gated image. Furthermore, the same list data was retrospectively gated based on the Anzai respiratory signal and an Anzai-gated image was also reconstructed. In addition, two ungated images (10&3min) were unlisted and reconstructed from the same list data. All images were compared using line profiles, contrast, max and mean activity concentration (AC) for all spheres. **Results:** The respiratory waveforms recorded by the two devices and their respective Fourier transforms were identical and had a correlation coefficient of 0.97 & 0.99 respectively. The two gated images showed similar contrast (<3% difference) and AC (<2% difference) and exhibited similar improvement in contrast & AC when compared to ungated images. **Conclusion:** Our in-house amplitude-gating device has similar performances compared to the Anzai equipment