## Performance Characteristics of a Siemens E.CAM+ Dual-Camera Coincidence Imaging System

The performance characteristics of a Siemens E.CAM+ dual-camera coincidence imaging system, including spatial resolution, energy resolution and coincidence detection sensitivity, were measured at different energy windows, counting rates and different combinations of coincidence pairs. Measurements were made using point and line sources of Ge-68 and F-18, and a NEMA standard phantom. Experimental data were acquired in list-mode, rebinned using the single-slice rebinning (SSRB) method and reconstructed using the filtered backprojection algorithms. The default acquisition mode accepts mostly peak-peak counts and rejects a substantial amount of peak-Compton and Compton-Compton counts for improved image quality at the expense of lower detected counts. Using the default acquisition mode, the energy resolutions for 511 keV are ~7.5% and ~9% at low and high dead times. Using a 20% energy window for the peak-peak counts, the radial and tangential spatial resolutions are ~5 mm at the center-of-rotation (COR) and increases only slightly as function of distance from the COR. The noise-equivalent count-rate peaks at ~640, 690 and 720 cps (with a ~0.2  $\mu$ Ci/ml source) and the detection sensitivities are 8.8, 9 and 9.7 kcps/( $\mu$ Ci/ml) (with a ~8.1 nCi/ml source) for 20% peak-peak, 30% peak-peak and 30% peak-peak plus scatter, respectively. The performance characteristics vary with different acquisition parameters. In conclusion, results from our study will be useful in determining the optimum acquisition parameters for specific clinical applications. The research described in this abstract was supported in part by a research contract from Siemens Medical Systems.