

Discussion

Comparing the performance of imaging instruments using images rather than more easily measured parameters such as FWHM, MTF, sensitivity, etc. is extremely difficult yet very necessary. Task-based tests, as we have attempted to use here, incorporate all the basic (objective) parameters into a complex entity - the image. Visual comparison of images by the human observer is subject to much error and bias. One can attempt to control for this by applying objective metrics to the image. Two such metrics are contrast and signal-to-noise-ratio (SNR).

But this is also full of many pitfalls. Evaluation of contrast and SNR for a single image is subject to criticism since it is only one instance of an image from an ensemble of such images. Nevertheless, we think there is merit in acquiring and analyzing such images, especially when several successive images are taken and the analysis repeated on each realization. We have done that in this work.

Modification to this technique in the future will include adoption of a protocol more in line with the revised NEMA PET report that is currently in near-final draft form. Test of contrast and noise are specified in this document using a standard elliptical "PET" phantom using hot and cold spheres.