

COS Target Acquisition ETCs

The COS acquisition exposure time calculators are used to help observers determine the exposure times required for the different kinds of target acquisition. There are four acquisition modes that can be used with COS: ACQ/IMAGE, ACQ/SEARCH, ACQ/PEAKXD, and ACQ/PEAKD. These are described in detail in Chapter 7 of the COS IHB. Note that the acquisition ETCs do not include overhead times associated with slews, grating changes, etc. These must be determined separately by the user from the information provided in Chapter 9 of the IHB or, in Phase II, with APT.

The acquisition ETCs are very similar to the normal imaging and spectroscopic ETCs, but there are some differences, as described below. Note that in all cases a S/N of 40 is recommended for COS acquisition exposures.

ACQ/SEARCH

This mode uses a spiral search to locate the target. It can be done in either imaging or dispersed light modes, so the user selects the appropriate acquisition ETC to calculate exposure times. If done in dispersed light mode, then the calculation is the same as for ACQ/PEAKD.

ACQ/IMAGE

This ETC is almost identical to the imaging ETC. The only difference is the size of the subarray used when calculating the signal to noise ratio (SNR). In the normal imaging ETC the S/N is computed in a 170x170 pixel subarray, but for acquisitions the subarray size is 9x9 pixels. The NUV detector dark background for this imaging acquisition subarray is approximately 0.017 counts per second, about the same count rate that one gets from a point source with a flat flux distribution with $f=7.5 \times 10^{-16}$ erg cm⁻² sec⁻¹ Å⁻¹.

ACQ/PEAKXD and ACQ/PEAKD

These dispersed light acquisition ETCs are very similar to the normal spectroscopic ETCs.

The geo-coronal airglow lines could reduce the SNR for acquisitions because they fill the aperture regardless of the pointing direction. To minimize this effect, the spectral region around the two strongest geo-coronal lines, Ly α 1215.7 Å and O I 1302 Å, are removed before the counts are summed by the flight software. Both of these lines appear in the FUV. The excluded region is wide enough to account for

the full width of the entrance aperture, 2.5 arcsec, with a little extra margin. The excluded region is approximately 350 pixels for G130M and G160M, and 1027 pixels for G140L.