

# The FES Streak Anomaly:

## A Summary

Michael Carini, Daryl Weinstein & Thomas Walker

*IUE Observatory*

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The FES streak anomaly, which was first noticed 1992 day 258, continues to plague the spacecraft (see Carini & Weinstein, 1992). Below we wish to summarize the current status of the anomaly and the effect it has on target acquisition and science data.

### A. Current Status

As mentioned above, the bright streak of light is still present in the FES. We have determined that the streak can be due to a combination of solar, lunar and/or earth light scattered down the telescope tube from an unknown scattering source external to the spacecraft. This scattering happens in such a way as to avoid rejection by the internal baffles. At this time, we feel that streaks caused by the moon are rare and of weak intensity, so we will concentrate our discussion only on solar and Earth streaks.

#### 1. Solar Streaks

- These appear to be  $\beta$  dependant: The streak is most intense at  $50 \leq \beta \leq 95$ , with a dip in the intensity near  $\beta \sim 75$ .
- There is no correlation between intensity and  $\beta$ . In the range described above, the streak intensity can vary by a factor of  $\sim 20$ .
- The streak has been seen to cover as much as 4/5 of the FES field of view.

#### 2. Earth Streaks

- These are transient, often appearing and disappearing during a given shift at a particular attitude.
- We have limited predictive power concerning these streaks: we can predict if an Earth streak will appear and when, but the intensity is an unknown quantity.
- These streaks will often appear in addition to a solar streak; however they are not the cause for the wide range in intensity at a given  $\beta$  seen for the solar streaks.

### B. Effect on Operations

This streak has effected the operations of the spacecraft. Both target acquisitions and spectral data are affected in a variety of ways due to this phenomena. Below we will describe a few points observers should keep in mind when trying to observe with this anomaly present.

#### 1. Target Acquisitions

- Targets with  $m \geq 8.0$  may have to be acquired as blind offsets; targets traditionally acquired as blind offsets may have to be acquired with a second offset, if the first offset star is fainter than 8.0.

- If the streak is particularly severe at a given attitude, maneuvering the spacecraft to a higher  $\beta$  (generally  $\beta$  107-108) and back to the target attitude has been known to lessen the streak intensity.

- The streak often covers the reference point, requiring the staff to use an alternate reference point in a region of the FES not effected by the streak to acquire the target.

## 2. Science Data

- Obtaining light curves and reliable magnitude estimates from the FES is now difficult and not recommended. However, the FES is still a viable aquisition camera, since we can measure the magnitude of an object accurately enough to determine if it is the target of interest.

- Guide stars are often difficult to come by, and long exposures may now have to be taken in segments on gyros. Segment lengths are determined by the stability of the spacecraft, but observers can expect the maximum segment length to be 30 minutes. This results in an  $\sim 25\%$  reduction in exposure time, due to the added overhead of recentering the exposure between segments.

- Long LWP low dispersion spectra may be contaminated with a diffuse solar spectrum if the streak is present and covering the apertures. This can happen in as little as two hours, in the case of an intense streak.

The staff continues to work diligently to understand this anomaly and to minimize the impact on science operations. We wish to strongly encourage observers to contact the observatory staff well in advance of their observing run if they feel this anomaly may have an adverse impact on their observing plans. This will help insure that the program's time will be used wisely.