



STScI | SPACE TELESCOPE
SCIENCE INSTITUTE

Instrument Science Report COS 2018-03(v2)

Cycle 24 COS NUV Dark Monitor Summary

Mees B. Fix¹

¹ Space Telescope Science Institute, Baltimore, MD

31 July 2018

ABSTRACT

Here we summarize the Cycle 24 NUV Dark Monitoring Program for the Cosmic Origins Spectrograph (COS) on the Hubble Space Telescope (HST) covering dates November 2016 to October 2017. We give an overview of the calibration plan and summary for this calibration program.

Contents

- Introduction (page 1)
- Analysis and Results (page 2)
- Summary (page 2)
- Change History (page 3)

1. Introduction

Program 14521 is designed to perform routine monitoring of the NUV MAMA detector dark rate. The main purpose is to look for evidence of a change in the dark, both to track on-orbit time dependence and to check for any developing detector problems. Results from this program are used to update the ETC. Every two weeks,

two 22-minute exposures were taken with the shutter closed for a total of 52 orbits. All observations were successful.

2 Analysis and Results

The global dark rate of each observation was measured, and the overall trend was monitored as a function of time. The data, initially fit well with a linear relation, now shows a slower increase with time and larger variability, the latter being induced by temperature and seasonal changes (Figure 1). Due to the changing trend with time, we adopt an ETC estimate for the dark-rate that corresponds to the 95% level in the probability distribution function determined from dark measurements over a period of the previous 6 months to 1 year.

3 Summary

The COS NUV detector dark rate continues to follow former trends. The overall trend continues to slowly increase linearly with larger variability.

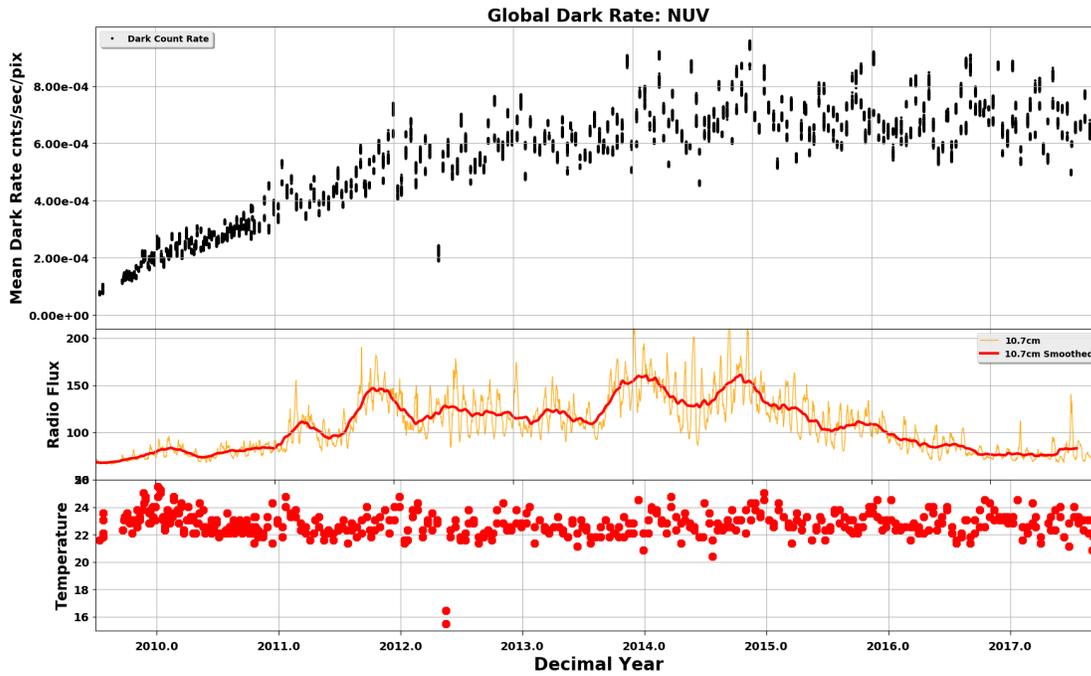


Figure 1. COS NUV dark rate as a function of time, from the COS installation through Cycle 24. The first subplot shows the measured dark-rate in 25 second increments throughout every observation. The groupings of points represent individual exposures, and demonstrate that the variability within a given exposure is low. The middle subplot displays the 10.7 cm radio flux used to track the solar cycle, and the last subplot displays the detector temperature for each observation.

Change History for COS ISR 2018-03

Version 1: 13 February 2018 - Original Document

Version 2: 31 July 2018 - Updated HST program ID for Cycle 24