# Functional Test Procedure

## IMAGE FUV WIC subsystem

University of California, Berkeley
Space Sciences Laboratory

Drawing No. 8307-W7 Rev A

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## 1. GENERAL

### 1.1 Scope

This procedure is intended for functional testing during the thermal vacuum testing of IMAGE Wideband Imaging Camera (WIC) flight equipment in the MSFC Thermal Vacuum Chamber.

### 1.2 Test equipment and vacuum feed-throughs.

This procedure involves operating the WIC instrument sense head in the vacuum chamber and monitoring of the performance remotely by test equipment located outside.

List of test equipment.

GSE power supply unit to power WIC electronics HV power supply and shutter door assembly.
WIC GSE electronics to process digital video data from WIC CCD camera.
FUV Optical light source in chamber with suitable collimator to produce a high resolution "star" at the WIC focal plane
3 way image splitter to produce 3 different collimated beams in the WIC optics.

### 1.3 Acronyms and Definitions

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| WIC | Part of the FUV instrument, the Wideband Imaging Camera consisting of an FUV intensified CCD and analog digital converter electronics. |
| OGSE | Optical GSE including a lamp suitable of producing an image i.e. a star in the WIC instrument. The wavelength of this light should be in the primary wavelength region of WIC Camera from 140 nm to 190 nm. |
| EGSE | Electrical GSE. Power supply unit to power WIC and WIC high voltage power supplies. WIC GSE with digital data input to computer and computer display for displaying images. Software to measure pixel locations and intensities in the image. |
| HVMCP | Working level high voltage for MCP. This is determined during prior tests which optimizes the WIC detection of single events but does not saturate too readily for brighter auroras. |

## 2. FUNCTIONAL TEST PROCEDURES

### 2.1 Preparation

1. Make connection EGSE between power supplies and WIC, WIC high voltage power supply and WIC aperture door through vacuum feed throughs.

2. Install WIC detector hardware, and OGSE light sources and three way splitter into the chamber. All hardware, including cables and fixtures, should be pre-cleaned and have suitable materials that meet outgassing requirements for space flight hardware.
3. Set up computer to display WIC images and to integrate them for 300 frames digitally in the computer. Software should allow to place cursor on parts of the image and integrate the video signal in an assigned area around the cursor.

### 2.2. Test Flow

> Note : WIC High Voltage must not be turned on unless the WIC image tube is evacuated to pressures below $10^{-5}$ torr for two hours prior to turn on.

1. Turn on low voltage external power supply to power WIC and WIC HV supply **with HV supply in the inhibit mode**. Note current.
2. If pressure has been $<10^{-5}$ for at least two hours turn on WIC high voltage power supply. Observe image and make measurements of representative picture regions. Measure the background signal level for various image regions. Note result in log sheet.
3. Turn off high voltage supply
4. Turn on lamp for collimated three-beam splitter set up.
5. Lower high voltage command input to apply minimum high voltage to MCP. Apply full working high voltage for phosphor.
6. Turn on high voltage and slowly bring it up towards working level. Note when light spots appear. Reduce light intensity until at the predetermined working MCP high voltage, an acceptable image is formed after 300 frames integration. This level must be maintained constant during the rest of the tests.
7. Measure the position of the center of each image point.

8. Measure FWHM of each artificial star on the CCD.
9. Select area around star images and histogram CCD counts in adjacent bins to obtain intensity of each spot image.
10. Turn off High Voltage
11. Record results of functional on data sheets.
12. Turn all electronics OFF.
13. If set up is not disturbed same light source intensity should be used for subsequent tests and HV can be applied to the determined levels directly and test can be repeated at starting at point 7.

# Functional Test Log
# IMAGE FUV Project

Date:_____ Performed by:_____

Time:_____

Pressure:_____

Temperature:_____

Applied voltage:_____ Current taken by system: _____

Working level MCP high voltage:_____ Working level phosphor voltage: _____

**WIC TEST Data sheet**

| **Light source BG=back-ground, WIC stim lamp = on** | **Name of data record file** | **Position of highest intensity Pixel Number (x,y)** | **FWHM of star images** | **Size of selected region** | **Average signal in region** | **Histogram file** |
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** Record data on continuation sheet if necessary