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Astronomer's Proposal Tool
Bright Object Tool Regression Test Document

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1.0 Introduction

A set of proposals to test the functionality of the Bright Object Tool (BOT) are described in the following sections. In order to regression test the Bright Object Tool (BOT), a JUnit Test has been created for each proposal. JUnit is an open source framework designed for the purpose of writing and running tests the Java programming language. Each JUnit test will run a proposal through the BOT within the Astronomer's Proposal Tool (APT). When the BOT runs, the proposal is expected to generate a set of VOT files, containing the results from the BOT. A baseline set of VOT files have all been verified by comparing the VOT files with the BOT Results Tables and Aladin Graphical view (see Appendix A) in the APT GUI, and those files will be used as a baseline to check for new or missing files. The JUnit test will check for differences between the newly created VOT files and the baselined VOT files. If there are no new, missing, or changed VOT files, then the JUnit test passes. If this is not the case, the test fails. The JUnit Test will email the console output from the run, and the new and different VOT files as attachments to bot-regression@stsci.edu. Details on how to fix the error(s) are included in the email and the requirements of the JUnit test are included as well. The JUnit tests will run nightly and are located in the Regression Tests folder of the APT code repository.

Throughout the following proposals, all detectors are used at least once in order ensure detector coverage (see Table 1-1: Proposal Detector Coverage).

Detector	Used In Proposal
ACS/SBC	PATTERN *Vcrit* Illegal
ACS/WFC	$B–V \leq +0.1$ Large Error on *F* and *J* Incomplete Data
COS/FUV	Modes COS Dual Aperture No Stars in Field Only *F* or Only *J*
COS/NUV	Parallel COS Dual Aperture Only *F* or Only *J*
NIC1	POS-TARG

Detector	Used In Proposal
NIC2	Parallel *Vcrit*
NIC3	Illegal *V*
STIS/CCD	Ignore 'Not a Star' Flag
STIS/FUV-MAMA	Bright Stars have *V* and *B–V* in GSC2 $B–V \leq +0.1$ Only *F* or Only *J* Large Error on *F* and *J* Ignore 'Not a Star' Flag Trigger Values
STIS/NUV-MAMA	Detector Sizes Only *F* or Only *J* Ignore 'Not a Star' Flag
WFC3/IR	WFC3 IR with no 2MASS uses GSC2
WFC3/UVIS	Bright Stars have *V* and *B–V* in GSC2

Table 1-1: Proposal Detector Coverage

Note that the BOT results shown for the following proposals may not match what the current results are, but are included to give an idea of what the results might look like. For instance, the Exposure Time Calculators (ETCs) are updated every cycle, so any test that uses or displays the count rates will change.

2.0 Search Field

The following proposals are verified by comparing the objects listed in the VOT file for each proposal to see that the same object names and coordinates are found in the BOT Search Fields. Crowded fields are used for all targets such that objects lie just inside and just outside the search fields. If the search fields are changed, the same objects may not be found resulting in the test failing. For these tests, we are just concerned with which objects are found in the search (i.e. the details of the objects, such as spectral type and count rates, are not relevant).

2.1 Detector Sizes

This proposal is testing that BOT is properly reading the size of the detector from the instrument table; as the table are all of similar format, one detector will suffice for this test. The proposal is using G191-B2B as the target and the STIS/NUV-MAMA detector. The following table lists the objects that should be found.

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67

Table 2-1: Detector Sizes BOT Objects

2.2 Adjustments

The following proposals are testing the search field where various adjustments are specified.

2.2.1 POS-TARG

This proposal is testing that BOT is properly reading the POS TARG value ($x = 10$, $y = 10$) from the APT file; as the POS TARG values are not detector specific, one detector will suffice for this test. The proposal is using G191-B2B as the target and the NIC1 detector. The following table lists the objects that should be found.

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021859	05 05 27.8192	+52 49 50.20
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67
NAP9022077	05 05 32.7832	+52 50 16.41

Table 2-2: POS-TARG BOT Objects

2.2.2 PATTERN

This proposal is testing the BOT Search Field adjustment for a visit containing a pattern. The proposal uses a four-point mosaic box pattern. The target is G-191-B2B. There is one ACS/SBC exposure using the four-point mosaic box pattern. There are four overlapping BOT Search Fields due to the four-point box pattern. The following tables list the objects that should be found for each point in the pattern.

Pattern Point 1:
Instrument/Detector: ACS/SBC
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021385	05 05 29.3481	+52 49 3.70
NAP9021447	05 05 28.2111	+52 49 8.14
NAP9021473	05 05 29.9561	+52 48 56.08
NAP9021523	05 05 32.0050	+52 49 14.15
NAP9021544	05 05 28.6230	+52 49 16.96
NAP9021558	05 05 29.9121	+52 49 19.66
NAP9021671	05 05 33.6566	+52 49 31.38
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021744	05 05 34.7150	+52 49 35.81
NAP9021786	05 05 35.5865	+52 49 43.15
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021859	05 05 27.8192	+52 49 50.20
NAP9021860	05 05 25.2759	+52 49 54.85
NAP9021920	05 05 36.6376	+52 49 58.54
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67
NAP9022077	05 05 32.7832	+52 50 16.41
NAP9022088	05 05 33.9734	+52 50 16.82
NAP9022203	05 05 32.4536	+52 50 29.56
NAP9022242	05 05 28.6871	+52 50 33.78
NAP9022389	05 05 30.8752	+52 50 49.48

Table 2-3: Pattern Point 1 BOT Objects

Pattern Point 2:
Instrument/Detector: ACS/SBC
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021523	05 05 32.0050	+52 49 14.15
NAP9021544	05 05 28.6230	+52 49 16.96
NAP9021558	05 05 29.9121	+52 49 19.66
NAP9021671	05 05 33.6566	+52 49 31.38
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021744	05 05 34.7150	+52 49 35.81

Object ID	RA	Dec
NAP9021786	05 05 35.5865	+52 49 43.15
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021859	05 05 27.8192	+52 49 50.20
NAP9021860	05 05 25.2759	+52 49 54.85
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67
NAP9022077	05 05 32.7832	+52 50 16.41
NAP9022088	05 05 33.9734	+52 50 16.82
NAP9022203	05 05 32.4536	+52 50 29.56
NAP9022242	05 05 28.6871	+52 50 33.78

Table 2-4: Pattern Point 2 BOT Objects

Pattern Point 3:

Instrument/Detector: ACS/SBC

Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021385	05 05 29.3481	+52 49 3.70
NAP9021447	05 05 28.2111	+52 49 8.14
NAP9021523	05 05 32.0050	+52 49 14.15
NAP9021544	05 05 28.6230	+52 49 16.96
NAP9021558	05 05 29.9121	+52 49 19.66
NAP9021671	05 05 33.6566	+52 49 31.38
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021744	05 05 34.7150	+52 49 35.81
NAP9021786	05 05 35.5865	+52 49 43.15
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021859	05 05 27.8192	+52 49 50.20
NAP9021860	05 05 25.2759	+52 49 54.85
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67
NAP9022077	05 05 32.7832	+52 50 16.41
NAP9022088	05 05 33.9734	+52 50 16.82
NAP9022203	05 05 32.4536	+52 50 29.56
NAP9022242	05 05 28.6871	+52 50 33.78

Table 2-5: Pattern Point 3 BOT Objects

Pattern Point 4:
Instrument/Detector: ACS/SBC
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021385	05 05 29.3481	+52 49 3.70
NAP9021447	05 05 28.2111	+52 49 8.14
NAP9021523	05 05 32.0050	+52 49 14.15
NAP9021544	05 05 28.6230	+52 49 16.96
NAP9021558	05 05 29.9121	+52 49 19.66
NAP9021671	05 05 33.6566	+52 49 31.38
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021744	05 05 34.7150	+52 49 35.81
NAP9021786	05 05 35.5865	+52 49 43.15
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021859	05 05 27.8192	+52 49 50.20
NAP9021860	05 05 25.2759	+52 49 54.85
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67
NAP9022077	05 05 32.7832	+52 50 16.41
NAP9022088	05 05 33.9734	+52 50 16.82
NAP9022242	05 05 28.6871	+52 50 33.78
NAP9022389	05 05 30.8752	+52 50 49.48

Table 2-6: Pattern Point 4 BOT Objects

2.2.3 Modes

This proposal is checking the BOT Search Field adjustment for the COS modes ACQ/SEARCH and ACQ/PEAKD; an ACCUM mode exposure is included as the baseline.

The proposal uses the COS/FUV detector and has three exposures, one for each mode. The following tables list the objects that are found by the BOT.

Exposure 1:
Instrument/Detector: COS/FUV
Mode : ACCUM (baseline)
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68

Object ID	RA	Dec
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67

Table 2-7: Mode: Accum BOT Objects

Exposure 2:

Instrument/Detector: COS/FUV
Mode : ACQ/SEARCH
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67

Table 2-8: Mode: ACQ/SEARCH BOT Objects

Exposure 3:

Instrument/Detector: COS/FUV
Mode : ACQ/PEAKD
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021858	05 05 33.0505	+52 49 53.17
NAP9021859	05 05 27.8192	+52 49 50.20
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67

Table 2-9: Mode: ACQ/PEAKD BOT Objects

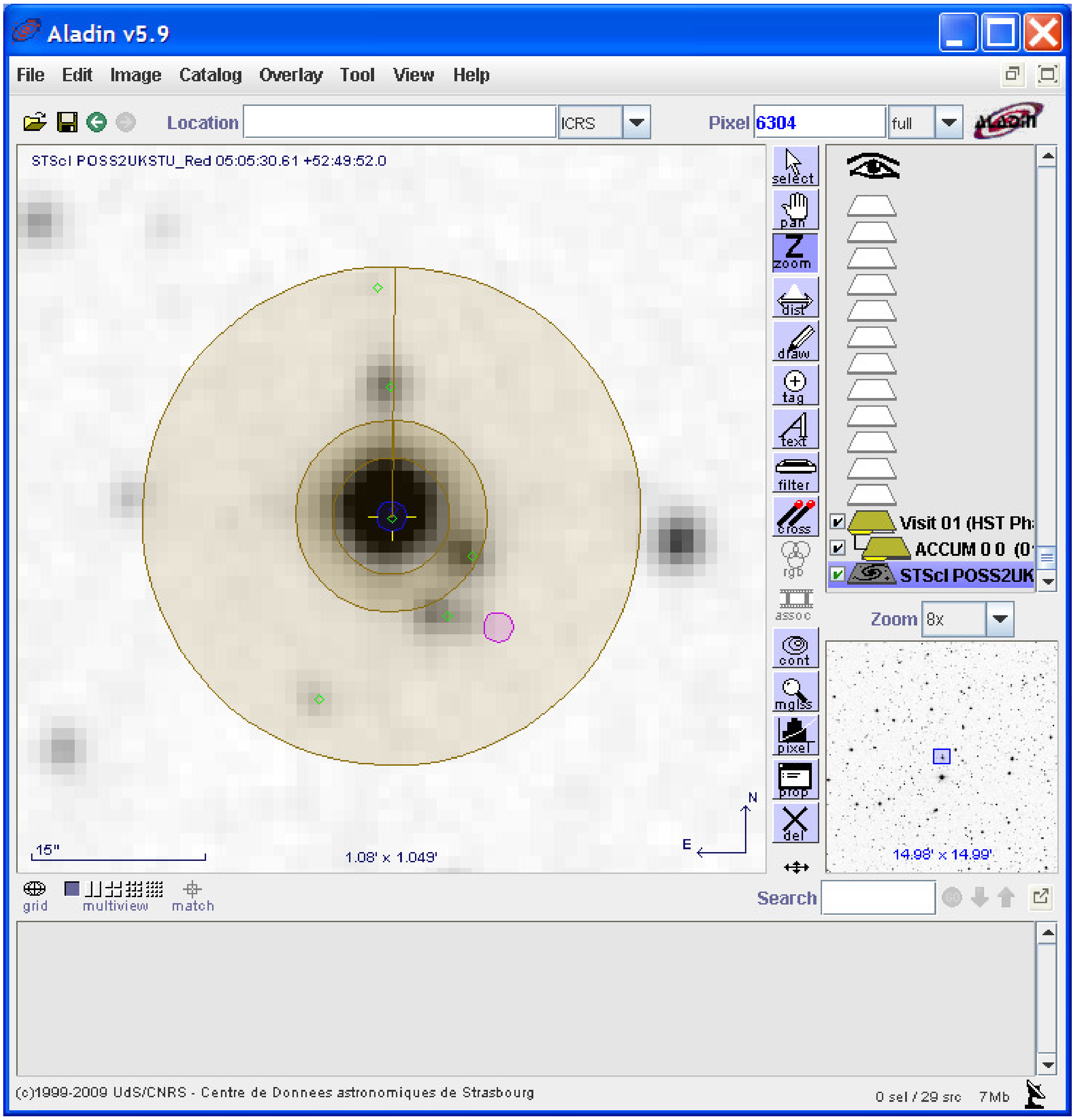

Figure 2-1: Exposure 1 ACCUM (baseline) Aladin View

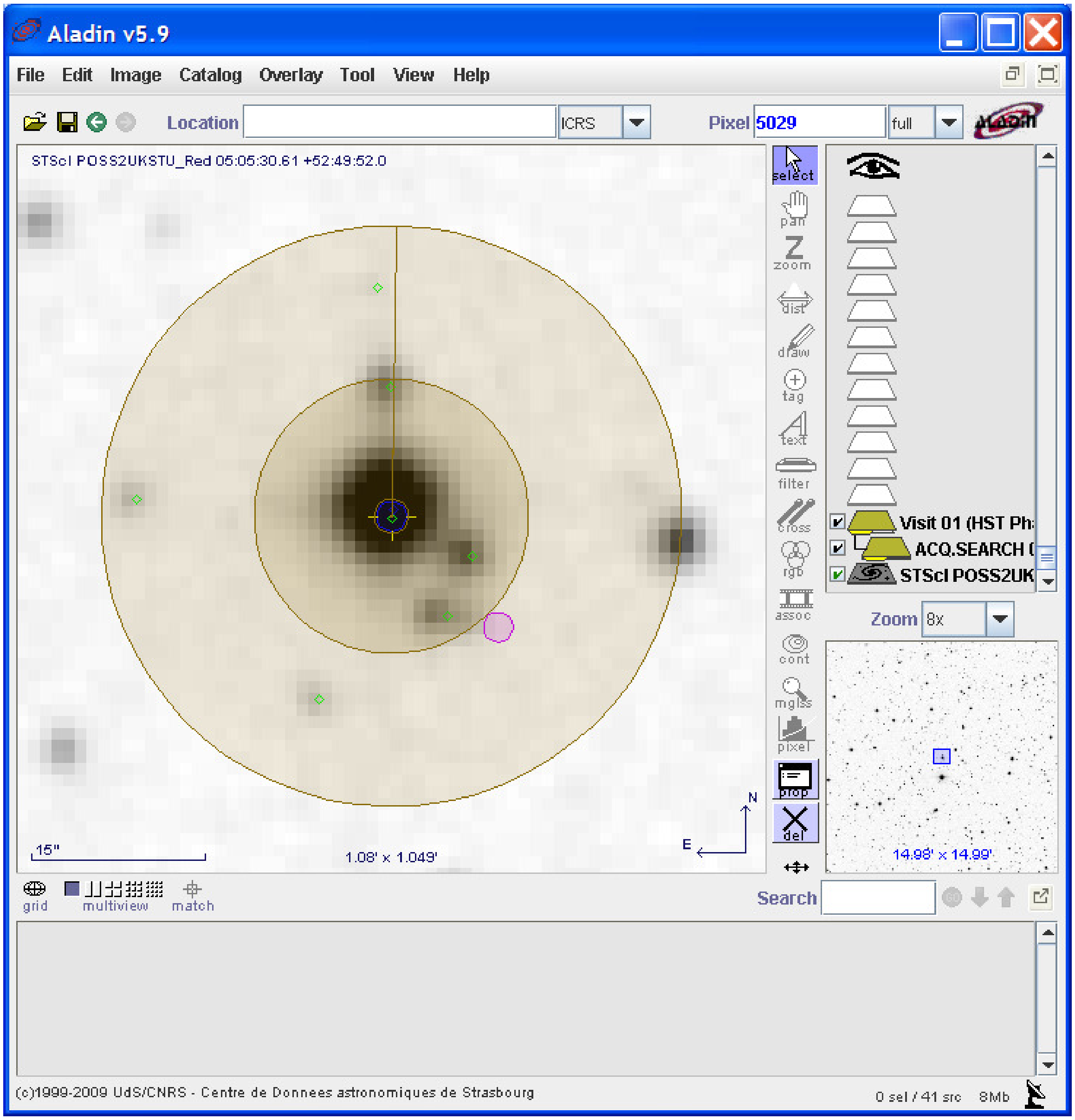

Figure 2-2: Exposure 2 ACQ/SEARCH Aladin View

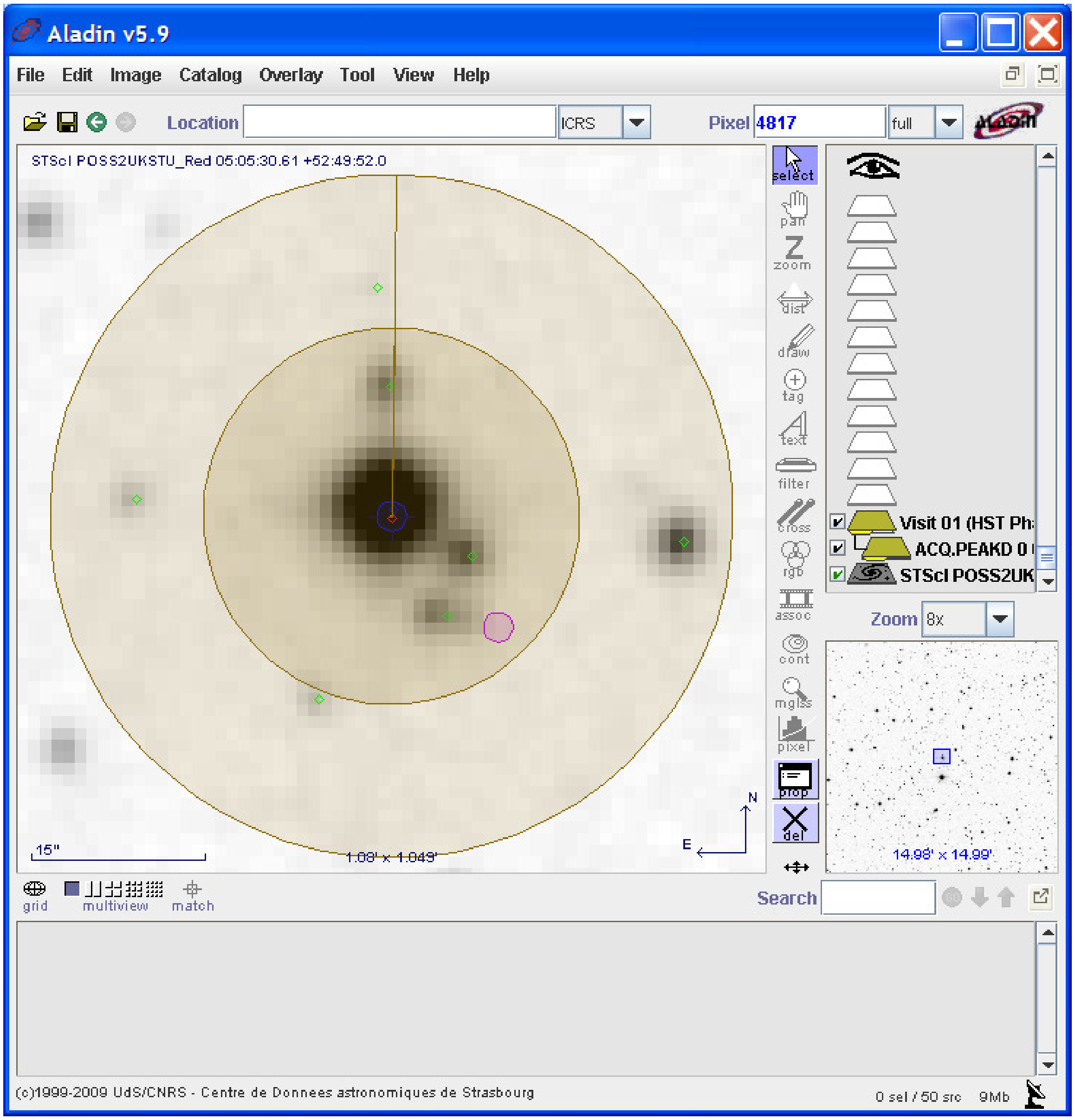

Figure 2-3: Exposure 3 ACQ/PEAKD Aladin View

2.2.4 Parallel

This proposal will check the BOT Search Field for a parallel exposure. The prime exposure uses COS/NUV, and the parallel exposure uses NIC2. The target is G-191-B2. For this test, we are just concerned with which objects are found in the search for the parallel exposure (i.e. the details of the objects, such as spectral type and count rates, are not relevant). The following tables list the objects that should be found.

Exposure 2 (Parallel):
Instrument/Detector: NIC2
Target: G-191-B2B

Object ID	RA	Dec
NAP9014965	05 06 21.5369	+52 39 22.42
NAP9014996	05 06 18.3893	+52 39 25.51
NAP9015489	05 06 24.6790	+52 40 3.01
NAP9015752	05 06 29.5807	+52 40 26.04
NAP9015763	05 06 28.0829	+52 40 18.91
NAP9015764	05 06 28.7054	+52 40 24.63
NAP9015828	05 06 31.9135	+52 40 29.89
NAP9015935	05 06 28.0664	+52 40 41.29
NAP9016063	05 06 29.9835	+52 40 51.76
NAP9016326	05 06 22.3553	+52 39 58.38
NAP9016328	05 06 24.6552	+52 40 2.93
NAP9032793	05 06 23.6829	+52 39 52.22
NAP9032797	05 06 25.0598	+52 39 54.54
NAP9032798	05 06 23.2819	+52 39 59.54
NAP9033730	05 06 21.4618	+52 39 40.90

Table 2-10: Parallel Exposure BOT Objects

2.2.5 COS Dual Aperture

This proposal will test the BOT Search Field using the COS Dual Aperture Adjustment. The proposal contains two exposures, one using COS/NUV, and one using COS/FUV. For this test, we are just concerned with which objects are found in the search (i.e. the details of the objects, such as spectral type and count rates, are not relevant). The following tables list the objects that should be found.

Exposure 1:
Instrument/Detector: COS/NUV
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67

Table 2-11: COS/NUV BOT Objects

Exposure 2:
Instrument/Detector: COS/FUV
Target: G-191-B2B

Object ID	RA	Dec
NAP9000385	05 05 30.5969	+52 49 52.68
NAP9000387	05 05 30.6061	+52 49 51.92
NAP9021714	05 05 31.2708	+52 49 36.11
NAP9021982	05 05 29.8389	+52 49 48.72
NAP9021983	05 05 30.6445	+52 50 3.22
NAP9021984	05 05 30.0677	+52 49 43.52
NAP9022018	05 05 30.7855	+52 50 11.67

Table 2-12: COS/FUV BOT Objects

3.0 Catalog Selection and Retrieval

The following section will describe the proposals to test that BOT uses the catalogs correctly in order to retrieve the BOT results.

3.1 Error Checking

This section will test that the tool alerts the user to errors while running the BOT.

3.1.1 No Stars in Field

This proposal will test that the BOT alerts the user when it finds no stars in the BOT search field. The proposal uses the target Messier-031 and contains one exposure using the COS/FUV detector. When the BOT runs, a pop-up appears with a warning that no stars were found (see Figure 3-1). In this example, BOT found no stars because the region is so crowded that the GSC2 could not differentiate objects (see Figure 3-2). This message will also appear when the region is blank.

Figure 3-1: Warning Message for No Stars

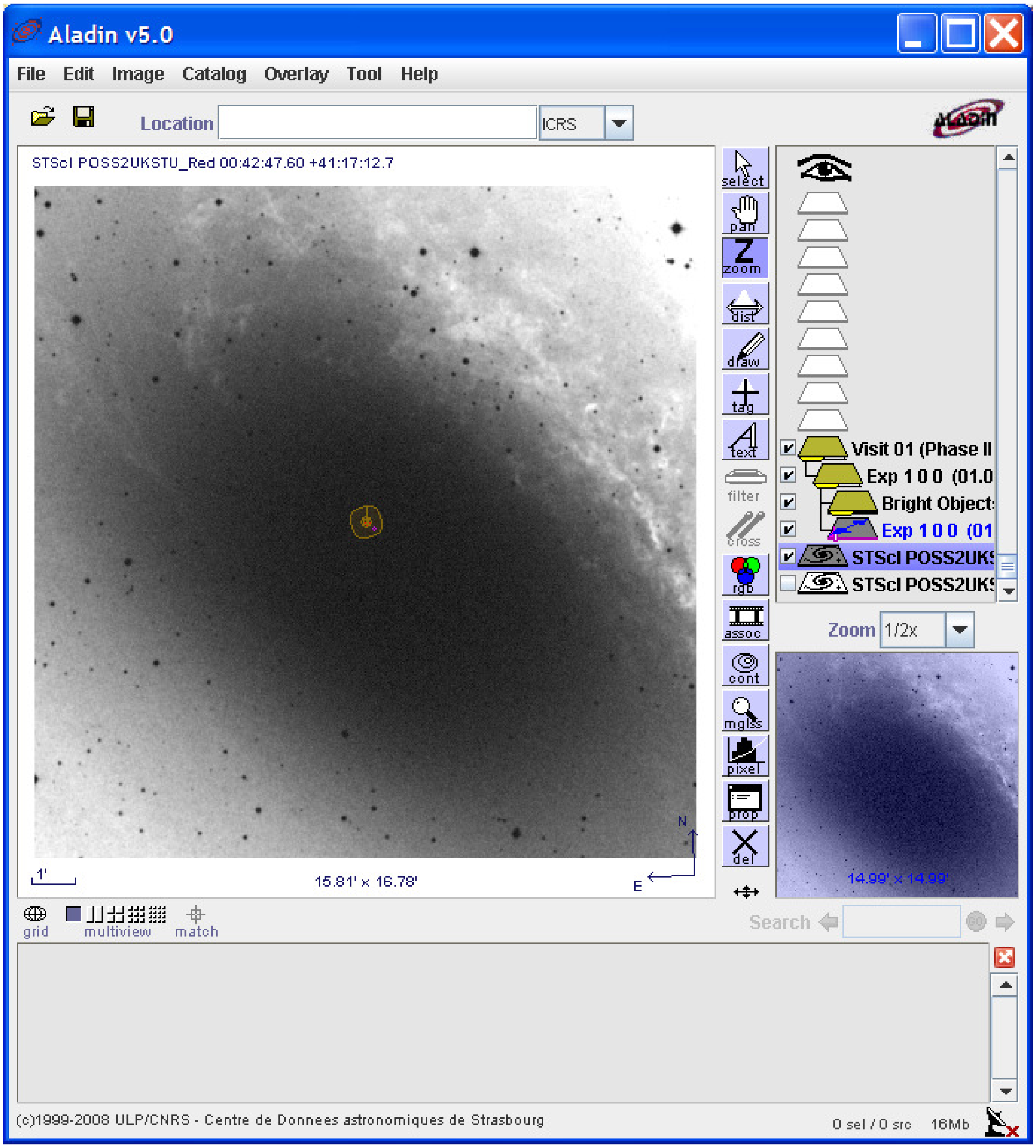

Figure 3-2: No Stars Aladin View

3.1.2 WFC3 IR with no 2MASS uses GSC2

This proposal will test that both 2MASS and GSC2 catalogs are used to retrieve information for the BOT. The proposal contains two fixed targets and one exposure for each target. Both exposures use the WFC3/IR detector.

Exposure 1 (GSC2):
Instrument/Detector: WFC3/IR
Target: Target 1 (RA: 23 59 52.0400 Dec: -00 00 45.30)

Target 1 has no 2MASS data. The table below lists the objects found by the BOT, all of which are retrieved from the GSC2 catalog.

Object ID	RA	Dec	Catalog
N000000193	23 59 54.5947	+00 00 6.96	GSC2
N000000205	23 59 52.8516	+00 00 16.43	GSC2
N000000225	23 59 55.2026	+00 00 28.68	GSC2
N000000251	23 59 53.2764	+00 00 42.91	GSC2
SB28004832	23 59 49.5410	-00 01 53.15	GSC2
SB28005007	23 59 55.6348	-00 00 15.40	GSC2
SB28006685	23 59 56.3892	-00 00 19.92	GSC2
SB28007593	23 59 56.3232	-00 01 5.76	GSC2

Table 3-1: COS/FUV BOT Objects

Exposure 2 (2MASS):
Instrument/Detector: WFC3/IR
Target: Target 2 (RA: 12 34 56.7000 Dec: +12 34 56.70)

Target 2 has 2MASS data. The table below lists the objects found by the BOT, all of which are retrieved from the 2MASS catalog.

Object ID	RA	Dec	Catalog
12345220+1236082	12 34 52.2031	+12 36 8.20	2MASS
12345455+1236261	12 34 54.5527	+12 36 26.14	2MASS
12345520+1235091	12 34 55.2024	+12 35 9.20	2MASS
12345569+1234405	12 34 55.6944	+12 34 40.53	2MASS
12345617+1234297	12 34 56.1778	+12 34 29.79	2MASS
12345810+1233325	12 34 58.1023	+12 33 32.53	2MASS
12345972+1234392	12 34 59.7259	+12 34 39.27	2MASS
12350124+1234016	12 35 1.2497	+12 34 1.68	2MASS
12350175+1234042	12 35 1.7518	+12 34 4.22	2MASS
12350202+1234231	12 35 2.0220	+12 34 23.19	2MASS

Table 3-2: COS/FUV BOT Objects

4.0 Convert to V and $B - V$

The following proposals will test the BOT's use of V and B–V.

4.1 Bright Stars have V and B–V in GSC2

This proposal will test that BOT correctly retrieves V and B–V values from the GSC2 catalog, and that it correctly computes V and B–V when the values are not specified in the catalog. This proposal contains two targets.

Exposure 1 (Bright Target):

Instrument/Detector: STIS/FUV-MAMA

Target: MIRA

The figure below shows the BOT Details Dialogue where the object SOF2000125 has *V* and *B–V* specified in the GSC2 catalog for the bright target, MIRA.

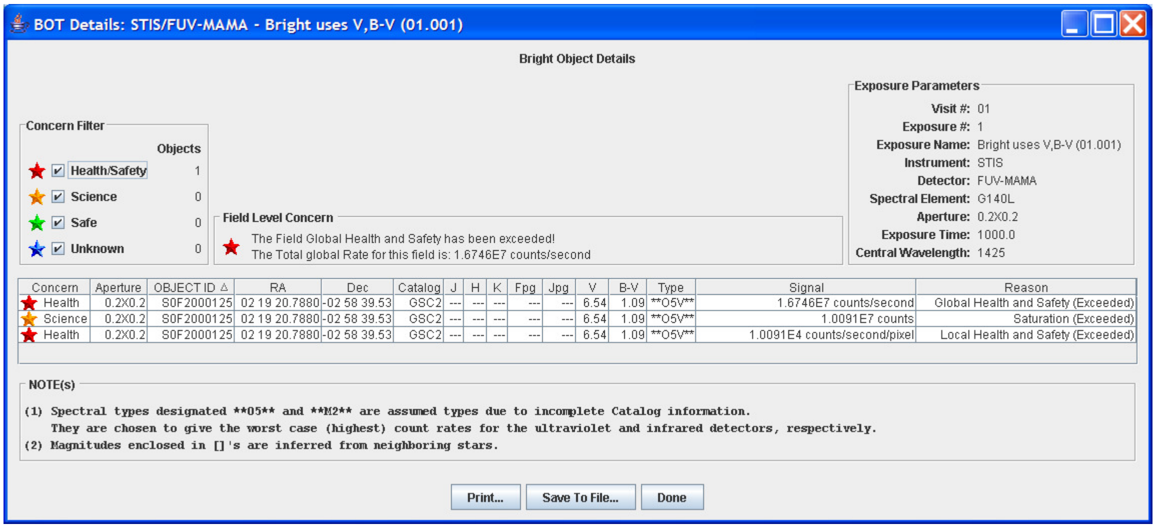

Figure 4-1: Bright Target has *V* and *B–V* in GSC2 – BOT Details Dialogue Box

Exposure 2 (Faint Target):

Instrument/Detector: WFC3/UVIS

Target: BOT-TARGET (F=13.8, J=15, V=12.01, B–V=0)

This exposure uses a BOT target where the *F*, *J*, *V*, & *B–V* values are manually specified. Since *V*=12.01, the target is too faint to have *V* and *B–V* specified in the GSC2 catalog. BOT will calculate the values (see Figure 4-2). The calculated values are confirmed below.

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$

$$V = 13.8 + 0.03 + 0.44 \times (15 - 13.8) - 0.03 \times (15 - 13.8)^2 + 0.02 \times (15 - 13.8)^3$$

$$V = 13.83 + 0.44 \times 1.2 - 0.03 \times 1.2^2 + 0.02 \times 1.2^3$$

$$V = 13.83 + 0.44 \times 1.2 - 0.03 \times 1.2^2 + 0.02 \times 1.2^3$$

$$V = 13.83 + 0.528 - 0.03 \times 1.44 + 0.02 \times 1.728$$

$$V = 14.358 - 0.0432 + 0.03456$$

$$V = 14.34936$$

$$B - V = 0.158 + 0.665 \times (J - F)$$
$$B - V = 0.158 + 0.665 * (0 - 0)$$
$$B - V = 0.158 + 0$$

$$B - V = 0.158$$

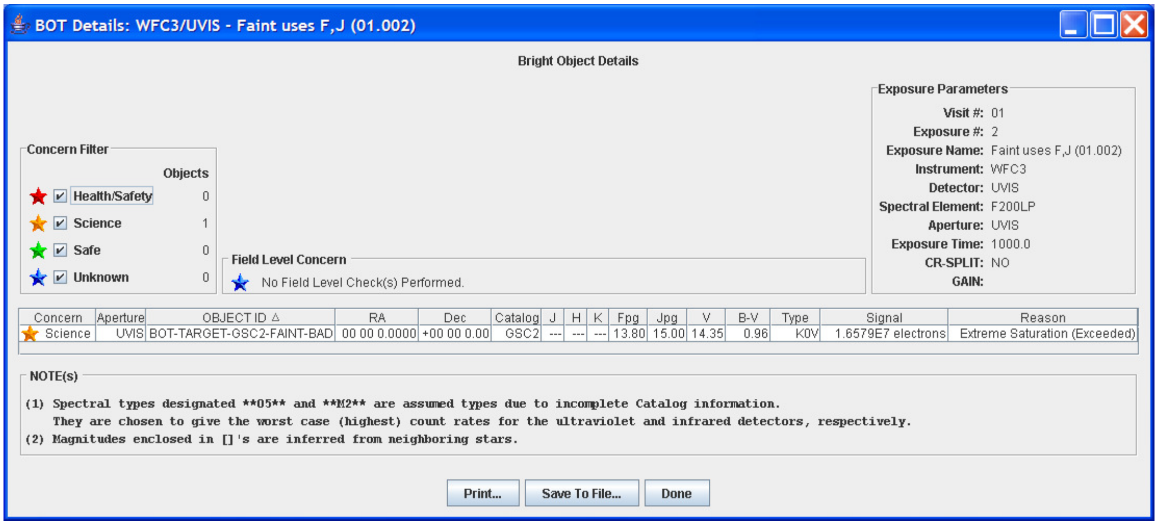

Figure 4-2: Faint Target Using F and J to Calculate *V* and *B–V* – BOT Details Dialogue Box

4.2 Detector Specific Adjustments

4.2.1 *B–V* ≤ +0.1

For UV detectors, there are two checks done for each star, a local and a global. The local looks at the brightest pixel, where the global looks at the total counts from the object. This proposal will test that for UV detectors, objects with a *B–V* value less than (bluer than) +0.1 are classified as 05V stars. For non-UV detectors, the objects will remain in their normal classification. This proposal contains two exposures, one using a UV Detector and one using a non-UV detector. Each exposure is using a BOT target where *B–V* is less than +0.1.

Exposure 1 (UV Detector):

Instrument/Detector: STIS/FUV-MAMA

Target: BOT-TARGET (F=18, J=17.9)

F and J are used to specify the *B–V* < +0.1 by the following calculation:

$$B - V = 0.158 + 0.665 \times (J - F)$$
$$B - V = 0.158 + 0.665 \times (-0.1)$$
$$B - V = 0.158 + (-0.665)$$

$$B - V = 0.0915 < +0.1$$

For UV detectors, when $B–V < +0.1$, the object is classified as an O5V star (see Figure 4-3).

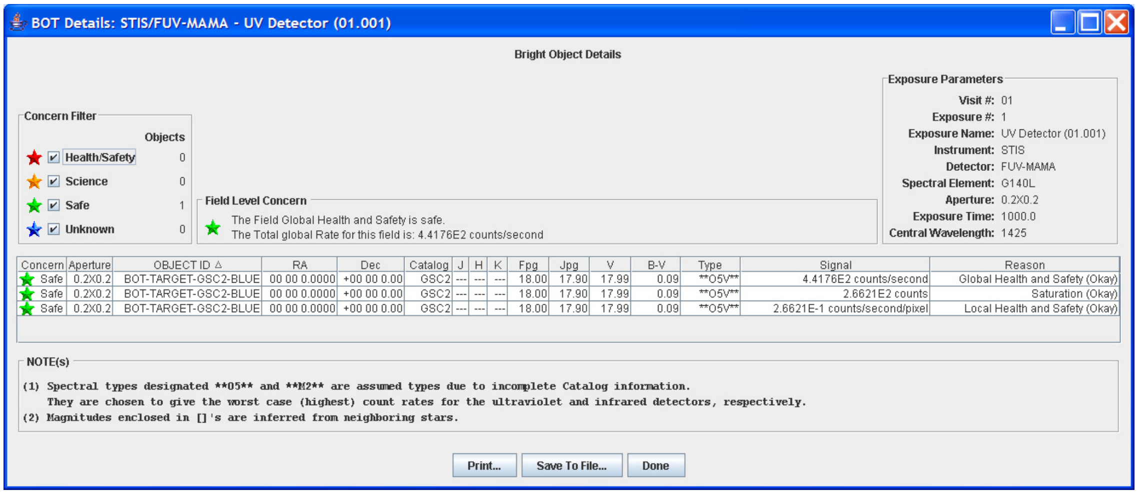

Figure 4-3: UV Detector O5V Star – BOT Details Dialogue Box

Exposure 2 (Non-UV Detector):
Instrument/Detector: ACS/WFC
Target: BOT-TARGET (F=18, J=17.9)

See calculation in Exposure 1 for B–V.

For non-UV detectors, when $B–V < +0.1$, the object is classified normally. In Figure 4-4, the object is classified as an A1V star.

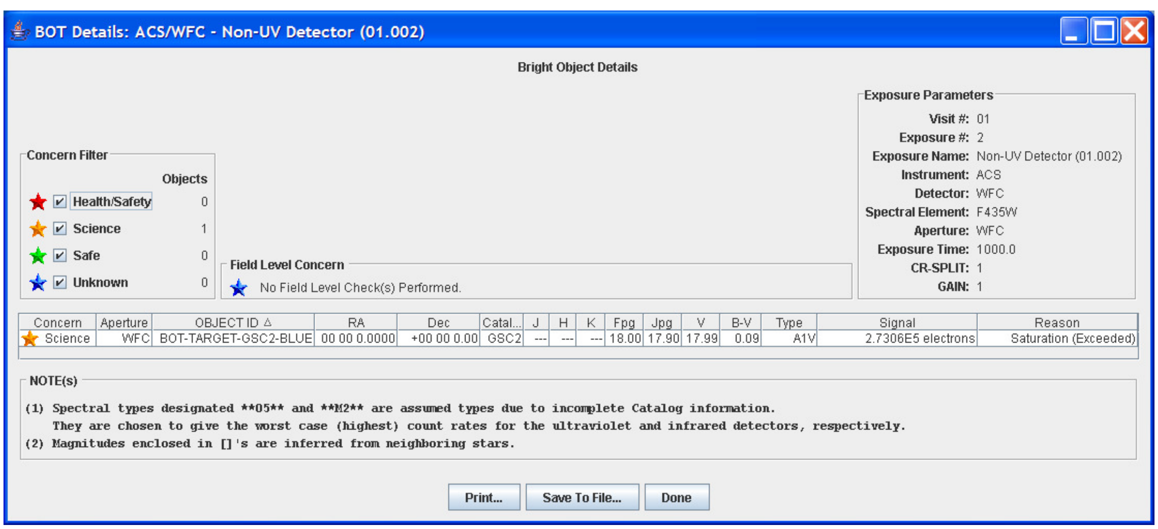

Figure 4-4: Non-UV Detector Normal Classification Star – BOT Details Dialogue Box

4.2.2 V_{crit}

This proposal will test the V_{crit} for a specific UV detector. The proposal will confirm that an object brighter than the V_{crit} ($< V_{crit}$) is classified as O5V, and an object fainter than

V_{crit} (> V_{crit}) is classified normally. It will also confirm for a non-UV detector, both objects are classified normally. Two BOT targets are used where V is above and below V_{crit}. There are a total of four exposures, one for each target for each detector.

Exposure 1 ($V < V_{crit}$):

Instrument/Detector: ACS/SBC

Target: BOT-TARGET (F=16, J=17.29)

ACS/SBC V_{crit}: 16.6

F and J are specified in the BOT-TARGET since V and $B–V$ are ignored for stars fainter than V=12. The following calculation confirms the F and J values where $V < V_{crit}$.

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$
$$V = 16 + 0.03 + 0.44 \times (17.29 - 16) - 0.03 \times (17.29 - 16)^2 + 0.02 \times (17.29 - 16)^3$$
$$V = 16.03 + 0.44 \times 1.29 - 0.03 \times 1.29^2 + 0.02 \times 1.29^3$$
$$V = 16.03 + 0.5676 - 0.03 \times 1.6641 + 0.02 \times 2.146689$$
$$V = 16.5976 - 0.049923 + 0.04293378$$
$$V = 16.59061078$$

$$V \approx 16.59 < V_{crit} = 16.6$$

Figure 4-5 confirms that for UV detectors, the BOT classifies objects brighter than V_{crit} as O5V.

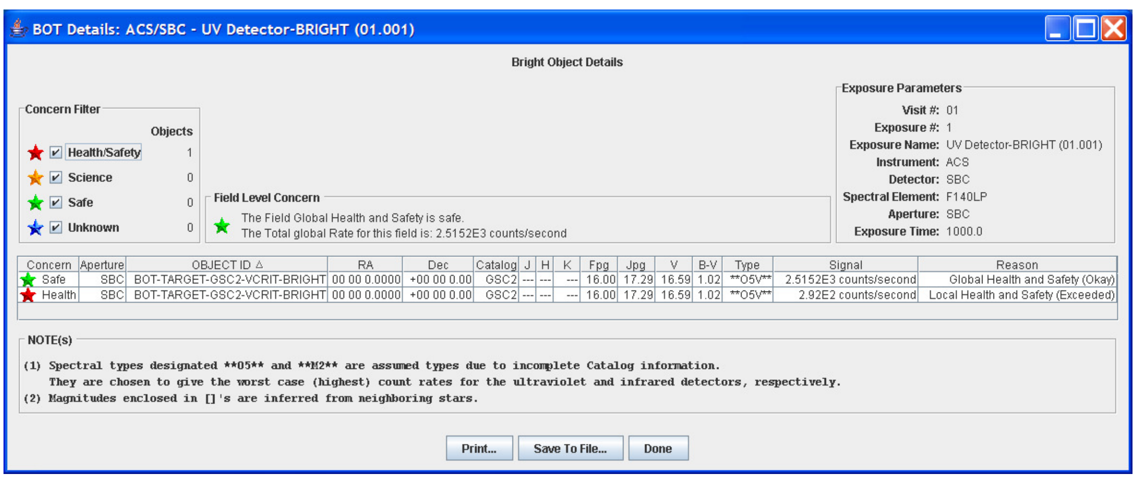

Figure 4-5: UV Detector Bright O5V Star – BOT Details Dialogue Box

Exposure 2 ($V > V_{crit}$):

Instrument/Detector: ACS/SBC

Target: BOT-TARGET (F=16, J=17.33)

ACS/SBC V_{crit}: 16.6

F and *J* are specified in the BOT-TARGET since *V* and *B–V* are ignored for stars fainter than *V*=12. The following calculation confirms the *F* and *J* values where $V < V_{crit}$.

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$
$$V = 16 + 0.03 + 0.44 \times (17.33 - 16) - 0.03 \times (17.33 - 16)^2 + 0.02 \times (17.33 - 16)^3$$
$$V = 16.03 + 0.44 \times 1.33 - 0.03 \times 1.33^2 + 0.02 \times 1.33^3$$
$$V = 16.03 + 0.5852 - 0.03 \times 1.7689 + 0.02 \times 2.352637$$
$$V = 16.6152 - 0.053067 + 0.04705274$$
$$V = 16.60918574$$

$$V \approx 16.61 > V_{crit} = 16.6$$

Figure 4-6 confirms that for UV detectors, the BOT classifies objects fainter than V_{crit} normally.

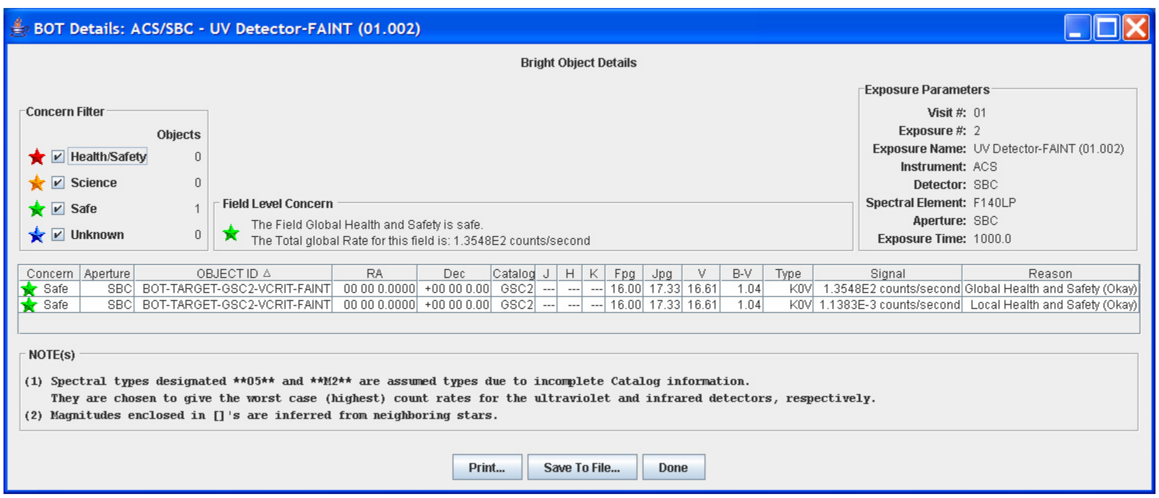

Figure 4-6: UV Detector Faint Normal Classification – BOT Details Dialogue Box

Exposure 3 (Non-UV Detector):
Instrument/Detector: NIC2
Target: BOT-TARGET (F=16, J=17.29)

See calculation for V in Exposure 1.

$$V \approx 16.59 < V_{crit} = 16.6$$

Figure 4-7 confirms that for non-UV detectors, the BOT classifies the object normally.

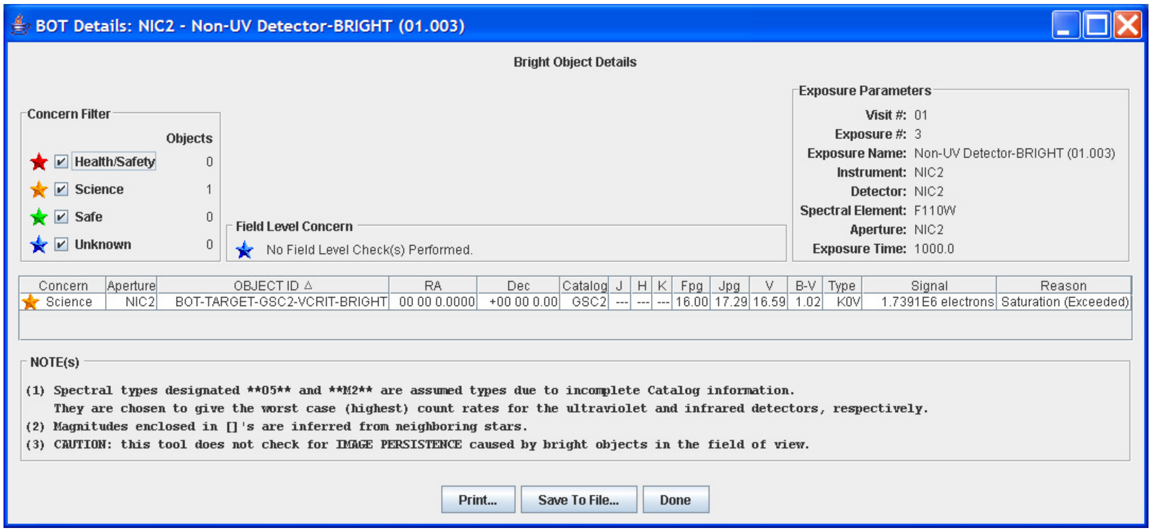

Figure 4-7: Non-UV Detector Normal Classification – BOT Details Dialogue Box

Exposure 4 (Non-UV Detector):

Instrument/Detector: NIC2

Target: BOT-TARGET (F=16, J=17.33)

See calculation for V in Exposure 3.

$$V \approx 16.59 < V_{crit} = 16.6$$

Figure 4-8 confirms that for non-UV detectors, the BOT classifies the object normally.

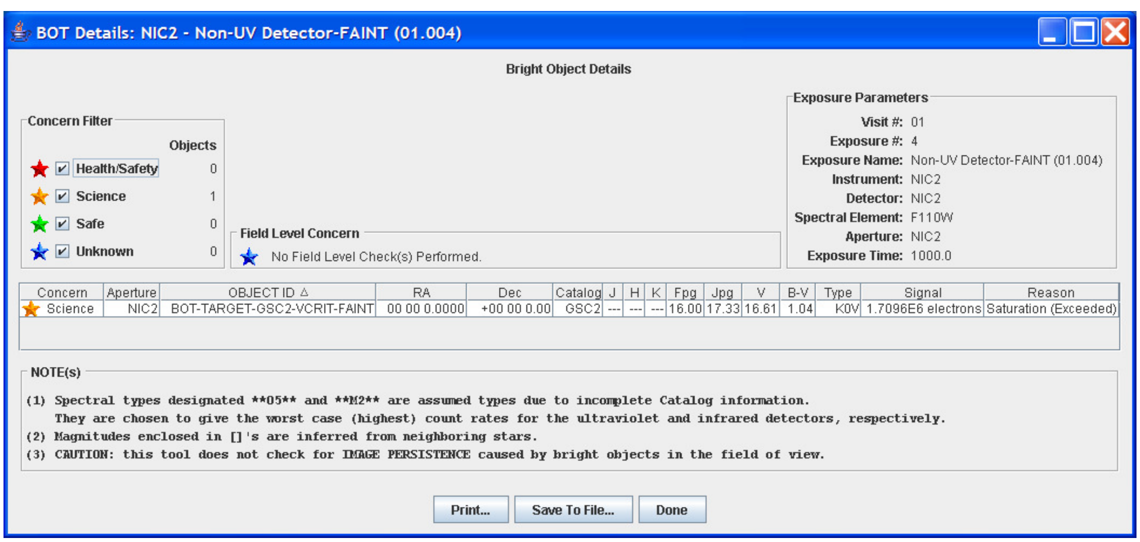

Figure 4-8: Non-UV Detector Normal Classification – BOT Details Dialogue Box

4.2.3 Only *F* or Only *J*

This proposal will test the BOT's conversion to *V* and *B–V* when only *F* or only *J* is specified. Four BOT targets are used, two where only *F* is specified and two where only *J* is specified. There are four exposures, one for each target.

For both STIS-MAMA and COS detectors, for objects where no *J* is specified or no *F* is specified, the BOT assumes the object is an O5V star where $J - F = -0.42$, and processes normally. If the object does not trigger an alert, BOT will list the *F* or *J*, *V*, spectral type (O5V), count rates, and status. If the object does trigger an alert, BOT will list the *F* or *J*, spectral type as "no color info," and reason as "unknown."

Exposure 1 (Only F):
Instrument/Detector: STIS/FUV-MAMA
Target: BOT-TARGET (F=10)

The following calculations are used to determine *V* and *B–V*:

$$J - F = -0.42$$
$$J - 10 = -0.42$$
$$J = 9.58$$

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$
$$V = 10 + 0.03 + 0.44 \times (-0.42) - 0.03 \times (-0.42)^2 + 0.02 \times (-0.42)^3$$
$$V = 10.03 + (-0.1848) - 0.03 \times 0.1764 + 0.02 \times (-0.074088)$$
$$V = 9.8452 - 0.005292 - 0.00148176$$

$$V = 9.83842624$$

$$B - V = 0.158 + 0.665 \times (-0.42)$$
$$B - V = 0.158 + (-0.2793)$$

$$B - V = -0.1213$$

See Figure 4-9 below where no alert has been triggered so BOT lists *F*, spectral type, count rates, and status.

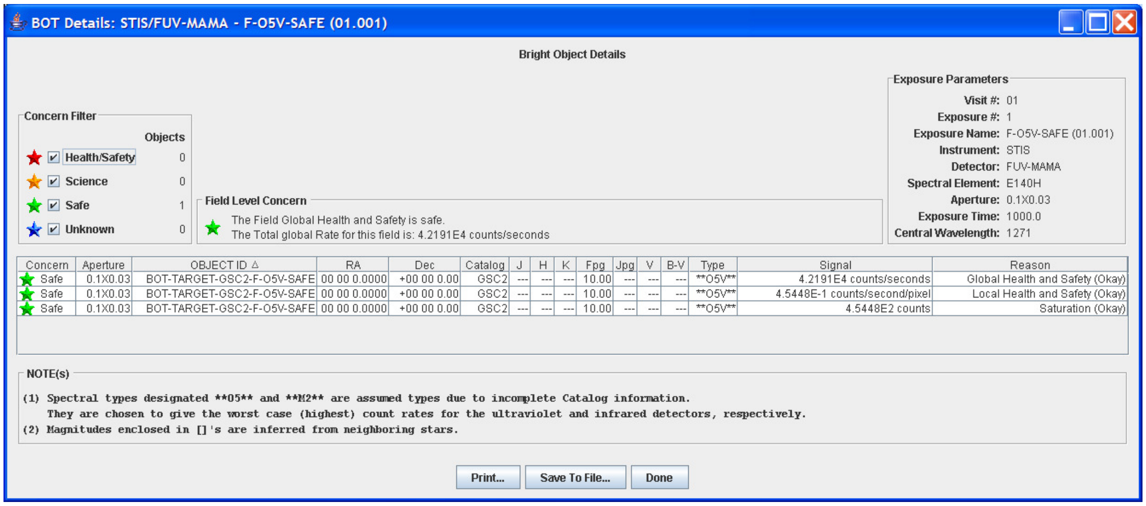

Figure 4-9: Only *F*, Processed Normally

Exposure 2 (Only F):

Instrument/Detector: STIS/NUV-MAMA

Target: BOT-TARGET (F=2)

The following calculations are used to determine *V* and *B–V*:

$$J - F = -0.42$$
$$J - 2 = -0.42$$

$$J = 1.58$$

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$
$$V = 2 + 0.03 + 0.44 \times (-0.42) - 0.03 \times (-0.42)^2 + 0.02 \times (-0.42)^3$$
$$V = 2.03 + (-0.1848) - 0.03 \times 0.1764 + 0.02 \times (-0.074088)$$
$$V = 1.8452 - 0.005292 - 0.00148176$$

$$V = 1.83842624$$

$$B - V = 0.158 + 0.665 \times (-0.42)$$
$$B - V = 0.158 + (-0.2793)$$

$$B - V = -0.1213$$

See Figure 4-10 below where an alert has been triggered so BOT lists *F*, “no color info,” and reason as “unknown.”

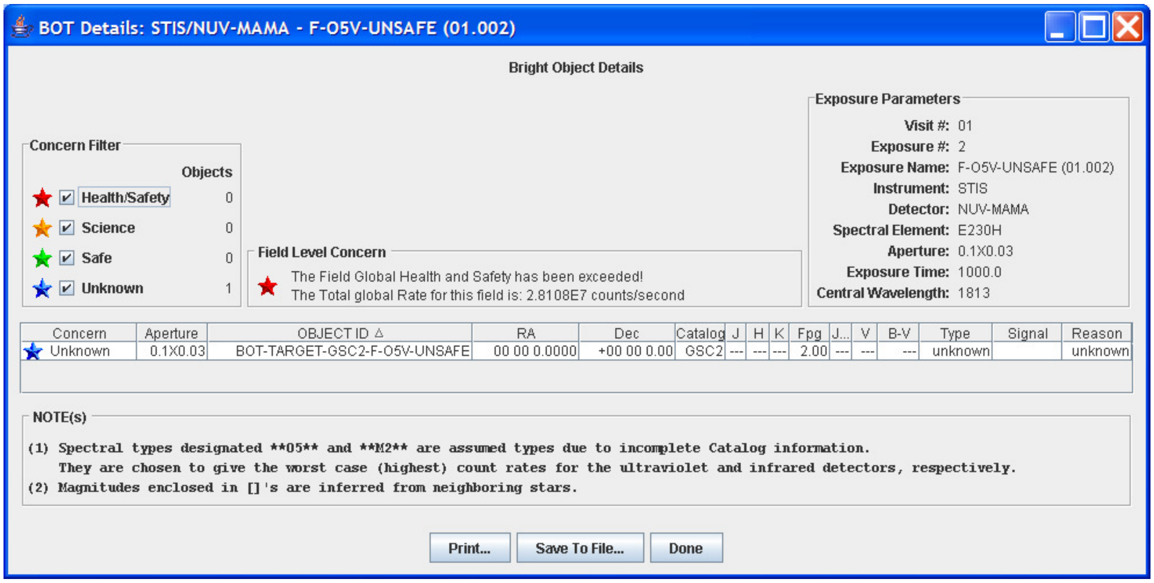

Figure 4-10: Only *F*, Object Unknown

Exposure 3 (Only J):
Instrument/Detector: COS/FUV
Target: BOT-TARGET (J=10)

The following calculations are used to determine *V* and *B–V*:

$$J - F = -0.42$$
$$10 - F = -0.42$$

$$F = 10.42$$

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$
$$V = 10.42 + 0.03 + 0.44 \times (-0.42) - 0.03 \times (-0.42)^2 + 0.02 \times (-0.42)^3$$
$$V = 10.45 + (-0.1848) - 0.03 \times 0.1764 + 0.02 \times (-0.074088)$$
$$V = 10.26252 - 0.005292 - 0.00148176$$

$$V = 10.25842624$$

$$B - V = 0.158 + 0.665 \times (-0.42)$$
$$B - V = 0.158 + (-0.2793)$$

$$B - V = -0.1213$$

See Figure 4-11 below where no alert has been triggered so BOT lists *J*, spectral type, count rates, and status.

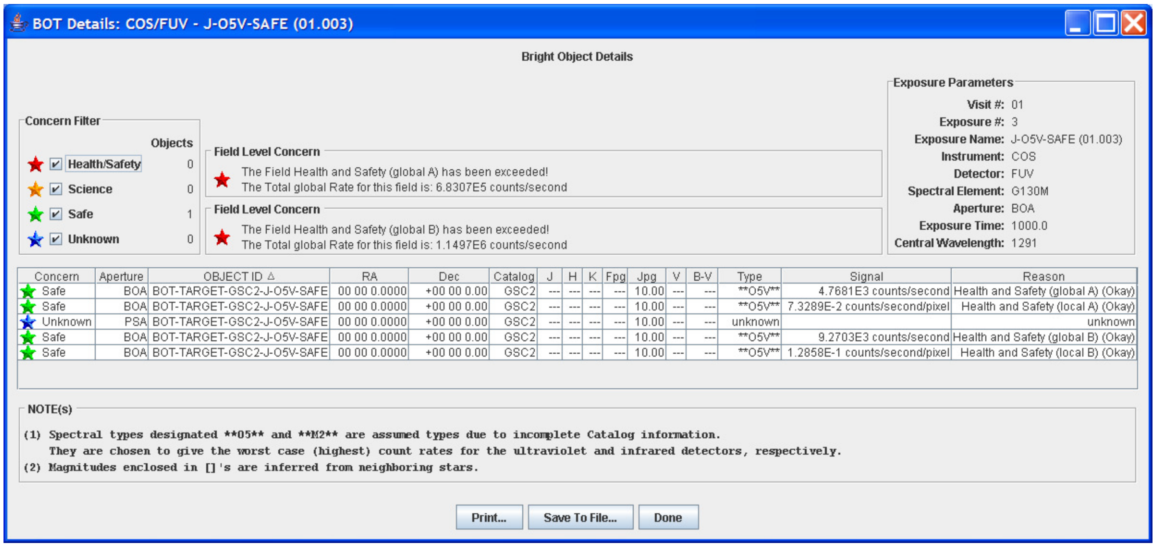

Figure 4-11: Only *J*, Processed Normally

Exposure 4 (Only J):

Instrument/Detector: COS/NUV

Target: BOT-TARGET (J=2)

The following calculations are used to determine V and $B–V$:

$$J - F = -0.42$$
$$2 - F = -0.42$$

$$F = 2.42$$

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$
$$V = 2.42 + 0.03 + 0.44 \times (-0.42) - 0.03 \times (-0.42)^2 + 0.02 \times (-0.42)^3$$
$$V = 2.45 + (-0.1848) - 0.03 \times 0.1764 + 0.02 \times (-0.074088)$$
$$V = 2.26252 - 0.005292 - 0.00148176$$

$$V = 2.25842624$$

$$B - V = 0.158 + 0.665 \times (-0.42)$$
$$B - V = 0.158 + (-0.2793)$$

$$B - V = -0.1213$$

See Figure 4-12 below where an alert has been triggered so BOT lists J, “unknown,” and reason as “unknown.”

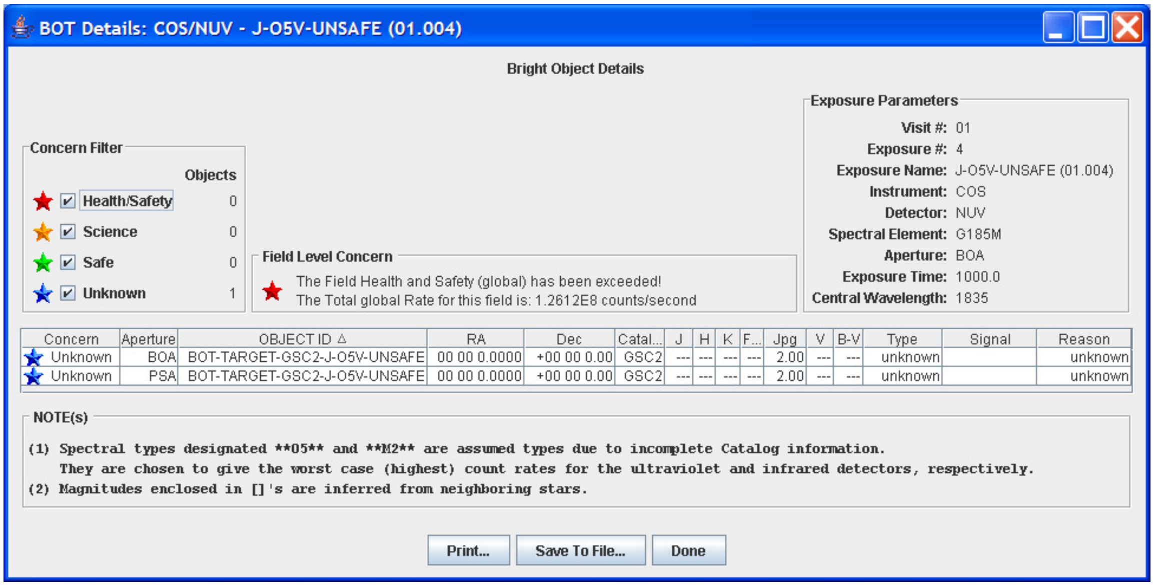

Figure 4-12: Only *J*, Object Unknown

4.2.4 Large Error on *F* and *J*

This proposal will test how *V* and *B–V* are calculated when there exists a large (>0.28) error on *F* and *J*. The proposal contains two BOT targets. The first target specifies *F* and *J*. The second specifies *F* and *J*, and a large error for both parameters.

Exposure 1 (No Error, Non-UV):
Instrument/Detector: ACS/WFC
Target: BOT-TARGET (F=15, J=15)

The following calculations confirm *B–V*:

$$B - V = 0.158 + 0.665 \times (J - F)$$
$$B - V = 0.158 + 0.665 \times (15 - 15)$$
$$B - V = 0.158 + 0.665 \times (0)$$
$$B - V = 0.158 + 0$$

$$B - V = 0.158$$

Spectral Type: A5

BOT displays A5 as the spectral type in Figure 4-13.

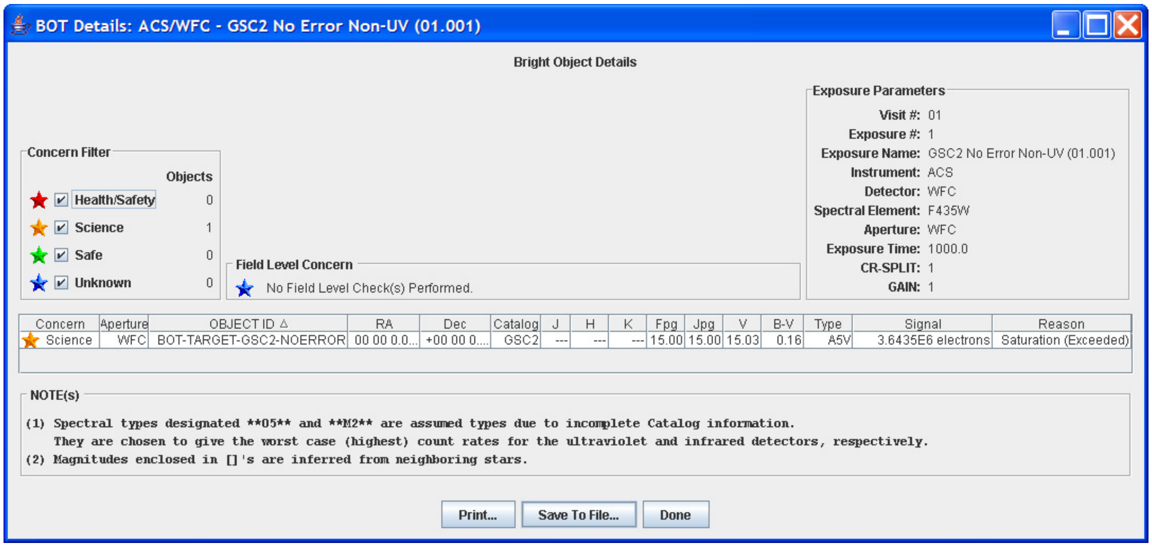

Figure 4-13: No Error, Non-UV Detector; Spectral Type A5

Exposure 2 (Error, Non-UV):

Instrument/Detector: ACS/WFC

Target: BOT-TARGET (F=15, J=15, F_{ERROR}=0.5, J_{ERROR}=0.5)

The tool will adjust the color by the difference between the nominal error and the actual error by making the color bluer by (*Error* – 0.28m). The *Error* is calculated by taking the square root of the sum of the squares of the *F* and *J* errors.

The following calculations confirm *B–V* with the errors on *F* and *J*:

$$B-V = 0.158 + 0.665 \times (J-F)$$
$$B-V = 0.158 + 0.665 \times (15-15)$$
$$B-V = 0.158 + 0.665 \times (0)$$
$$B-V = 0.158 + 0$$

$$B-V = 0.158$$

$$ERROR = \sqrt{F_{ERROR}^{\ 2} + J_{ERROR}^{\ 2}}$$
$$ERROR = \sqrt{0.5^2 + 0.5^2}$$
$$ERROR = \sqrt{0.25 + 0.25}$$
$$ERROR = \sqrt{0.5}$$

$$ERROR \approx 0.707$$

$$B - V = 0.158 - (ERROR - 0.28)$$
$$B - V = 0.158 - (0.707 - 0.28)$$
$$B - V = 0.158 - 0.427$$

$$B - V = 0.269$$

Spectral Type: O5

BOT displays O5 as the spectral type in Figure 4-14.

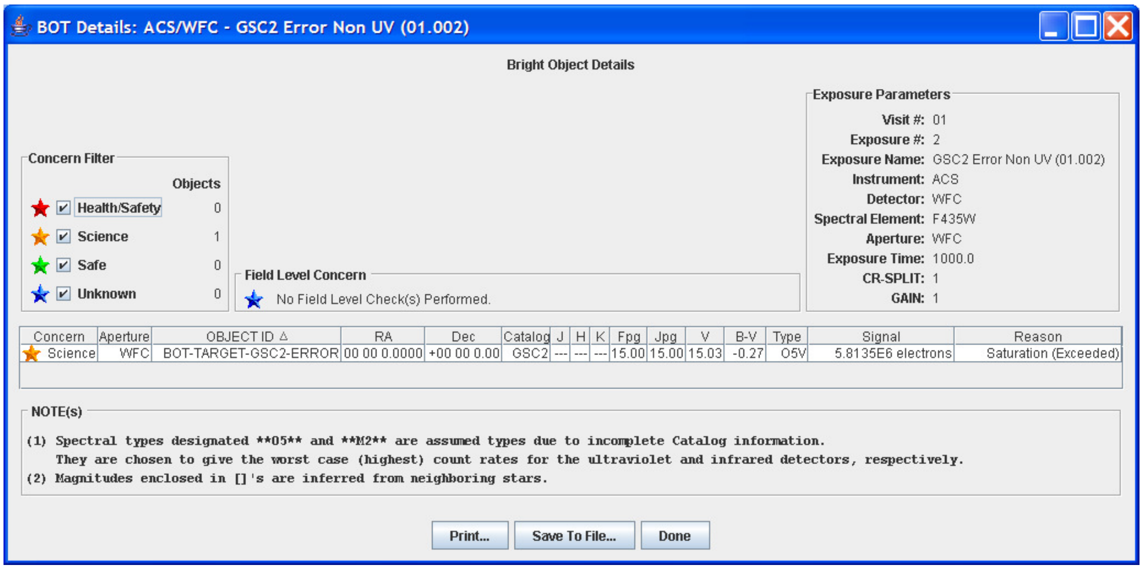

Figure 4-14: Error, Non-UV Detector; Spectral Type O5 – BOT Details Dialogue Box

Exposure 3 (No Error, UV):
Instrument/Detector: STIS/FUV-MAMA
Target: BOT-TARGET (F=15, J=15)

See Exposure 1 for B-V calculation.

$$B - V = 0.158$$

Spectral Type: A5

BOT displays A5 as the spectral type in Figure 4-15.

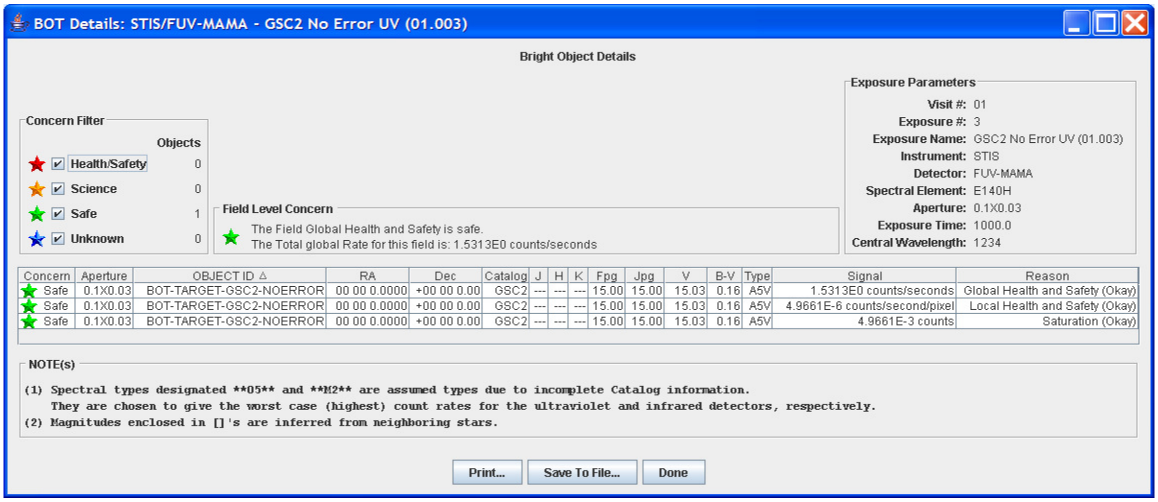

Figure 4-15: No Error, UV Detector; Spectral Type A5 – BOT Details Dialogue Box

Exposure 4 (Error, UV):

Instrument/Detector: STIS/FUV-MAMA

Target: BOT-TARGET (F=15, J=15, F_{ERROR}=0.5, J_{ERROR}=0.5)

See Exposure 2 for B-V calculation.

$$B - V = -0.269$$

Spectral Type: O5

BOT displays O5 as the spectral type in Figure 4-16.

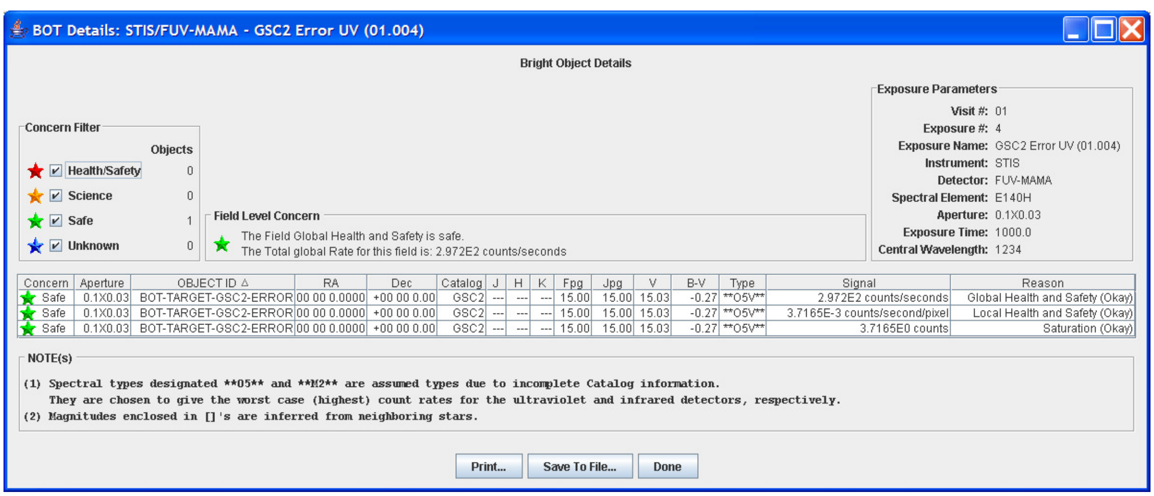

Figure 4-16: Error, UV Detector; Spectral Type O5 – BOT Details Dialogue Box

4.2.5 Ignore 'Not a Star' Flag

This proposal will test that the GSC2 'Not a Star' Flag is ignored for all faint objects when using a UV detector, which is implemented in order to account for objects that have poor S/N in the PSF. These objects are relevant for bright object checking, so they are included in the BOT results appearing as “unknown” objects when the flag is ignored. The proposal contains three exposures, one UV detector exposure with a target whose *V* value is fainter than the limit for accepting the ‘Not a Star’ flag, one UV detector exposure with a target whose *V* value is brighter than the limit for accepting the ‘Not a Star’ flag, and one non-UV detector exposure with a target whose *V* value is brighter than the limit for accepting the ‘Not a Star’ flag. In order to enable the ‘Not a Star’ flag, the parameter Type=”?” is used when defining the BOT targets.

Exposure 1 (UV Detector):
Instrument/Detector: STIS/NUV-MAMA
Target: BOT-TARGET (F=16, J=17.12)
Not a Star Flag Set: V>16.5

The following calculations confirm *V*>16.5 where the ‘Not a Star’ flag is set but ignored:

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$
$$V = 16 + 0.03 + 0.44 \times (17.12 - 16) - 0.03 \times (17.12 - 16)^2 + 0.02 \times (17.12 - 16)^3$$
$$V = 16.03 + 0.44 \times 1.12 - 0.03 \times (1.12)^2 + 0.02 \times (1.12)^3$$
$$V = 16.03 + 0.4928 - 0.03 \times 1.2544 + 0.02 \times 1.404928$$
$$V = 16.5228 - 0.037632 + 0.02809856$$

$$V \approx 16.513 > 16.5$$

The BOT displays the objects where the ‘Not a Star’ flag is set but ignored in Figure 4-17.

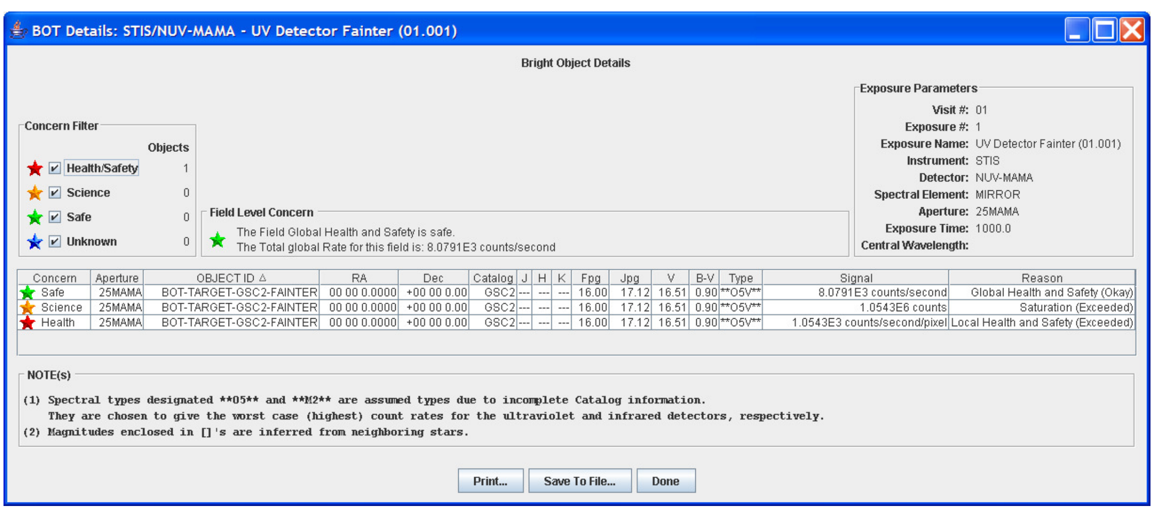

Figure 4-17: STIS/NUV-MAMA; *V* > 16.5; Not a Star Flag Ignored

Exposure 2 (UV Detector):

Instrument/Detector: STIS/FUV-MAMA

Target: BOT-TARGET (F=15, J=16.7)

Not a Star Flag Set: V>15.8

The following calculations confirm V<15.8 where the 'Not a Star' flag is not ignored:

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$

$$V = 15 + 0.03 + 0.44 \times (116.7 - 15) - 0.03 \times (16.7 - 15)^2 + 0.02 \times (16.7 - 15)^3$$

$$V = 15.03 + 0.44 \times 1.7 - 0.03 \times (1.7)^2 + 0.02 \times (1.7)^3$$

$$V = 15.03 + 0.748 - 0.03 \times 2.89 + 0.02 \times 4.913$$

$$V = 15.778 - 0.0867 + 0.09826$$

$$V \approx 15.790 > 15.8$$

The BOT displays the object type as 'not a star' because the 'Not a Star' flag is not ignored in Figure 4-18.

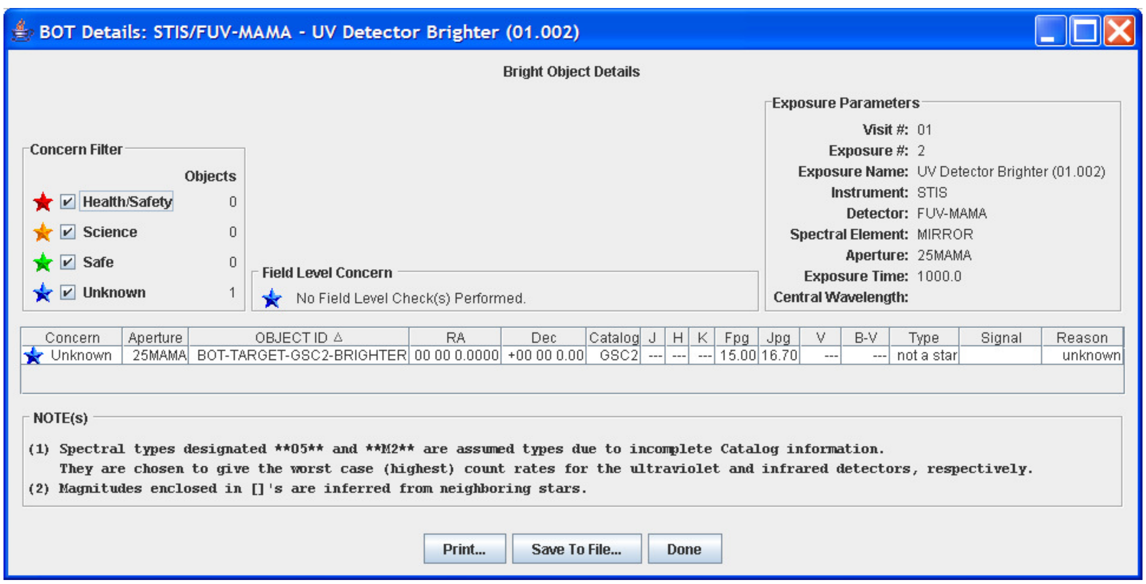

Figure 4-18: STIS/FUV-MAMA; *V*<15.8; Not a Star Flag Not Ignored

Exposure 3 (Non-UV Detector):

Instrument/Detector: STIS/CCD

Target: BOT-TARGET (F=16, J=17.12)

Not a Star Flag Set: V>16.5

For STIS, when both *F* & *J* are listed as parameters, the object is flagged as 'Not a Star.' The BOT details dialog lists *V*, *B–V*, spectral type = 'not a star,' and Reason = 'unknown.'

See Calculation for V in Exposure 1.

$$V \approx 16.513 > 16.5$$

The BOT displays the object type as 'not a star' because the 'Not a Star' flag is not ignored in Figure 4-19.

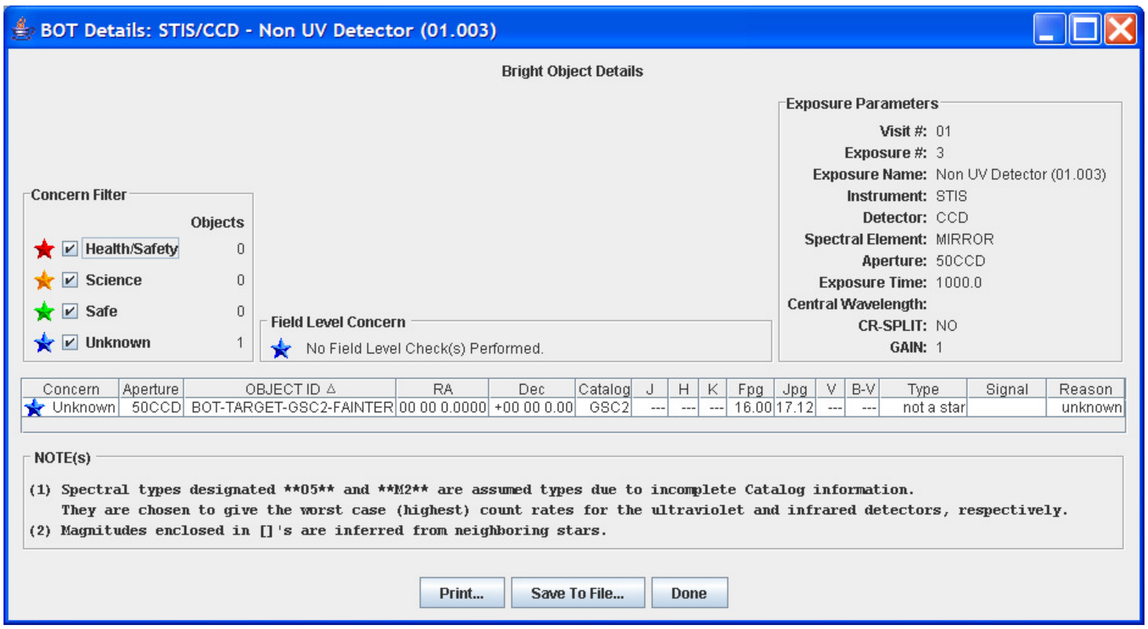

Figure 4-19: STIS/CCD; *V*>16.5; Not a Star Flag Set

4.3 Error Checking

This section will test that BOT correctly handles illegal *V* & *B–V* values, as well as incomplete data.

4.3.1 Illegal *V*

This proposal will test that for any *V* value brighter (less) than -2.0 or fainter (greater) than 24.0, the photometry is faulty and should not be used. These objects types will be listed as 'unknown' or 'no color info' and spectral elements will be listed as 'unknown' in the BOT details dialogue. This proposal will use four exposures with targets to test four cases of *V* values, one slightly inside and outside each bound.

Exposure 1:

Instrument: NIC3

Target: BOT-TARGET (V=-1.99, B–V =0)

The *V* value can be defined directly within the BOT-TARGET definition.

$$V = -1.99 > -2.0$$

The BOT does not consider the object as faulty since $V > -2.0$ (see Figure 4-20).

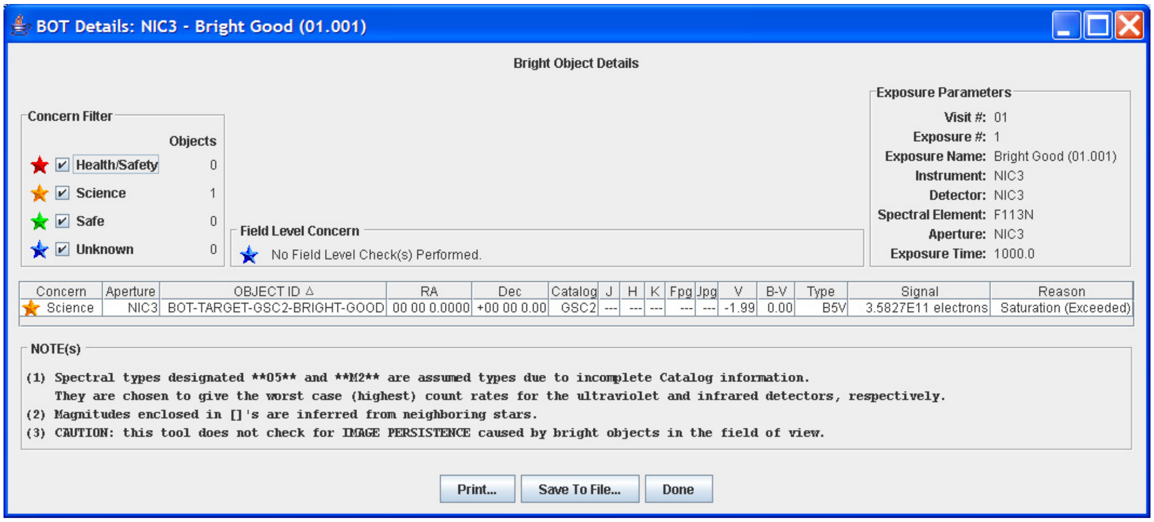

Figure 4-20: $V = -1.99 > -2.0$

Exposure 2:
 Instrument: NIC3
 Target: BOT-TARGET (V=-2.01, B–V =0)

The V value can be defined directly within the BOT-TARGET definition.

$$V = -2.01 < -2.0$$

The BOT considers the object as faulty since $V < -2.0$ (see Figure 4-21).

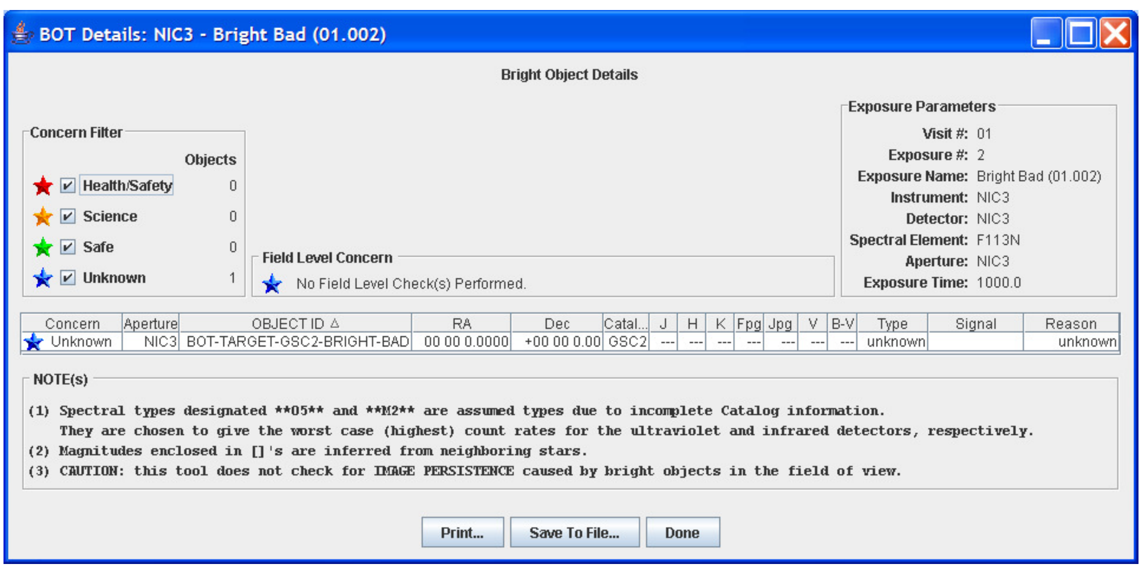

Figure 4-21: $V = -2.01 < -2.0$ and listed as unknown

Exposure 3:
 Instrument: NIC3
 Target: BOT-TARGET (F=23.96, J=23.97)

F and J values are used to define V since V and $B–V$ values are not in GSC2 for objects fainter than V=12.0 (See Bright Stars have V and $B–V$ in GSC2).

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$

$$V = 23.96 + 0.03 + 0.44 \times (23.97 - 23.96) - 0.03 \times (23.97 - 23.96)^2 + 0.02 \times (23.97 - 23.96)^3$$

$$V = 23.99 + 0.44 \times 0.01 - 0.03 \times (0.01)^2 + 0.02 \times (0.01)^3$$

$$V = 23.99 + 0.0044 - 0.03 \times 0.0001 + 0.02 \times 0.000001$$

$$V = 23.9944 - 0.000003 + 0.00000002$$

$$V \approx 23.994 < 24.0$$

The BOT does not consider the object as faulty since $V < 24.0$ (see Figure 4-22).

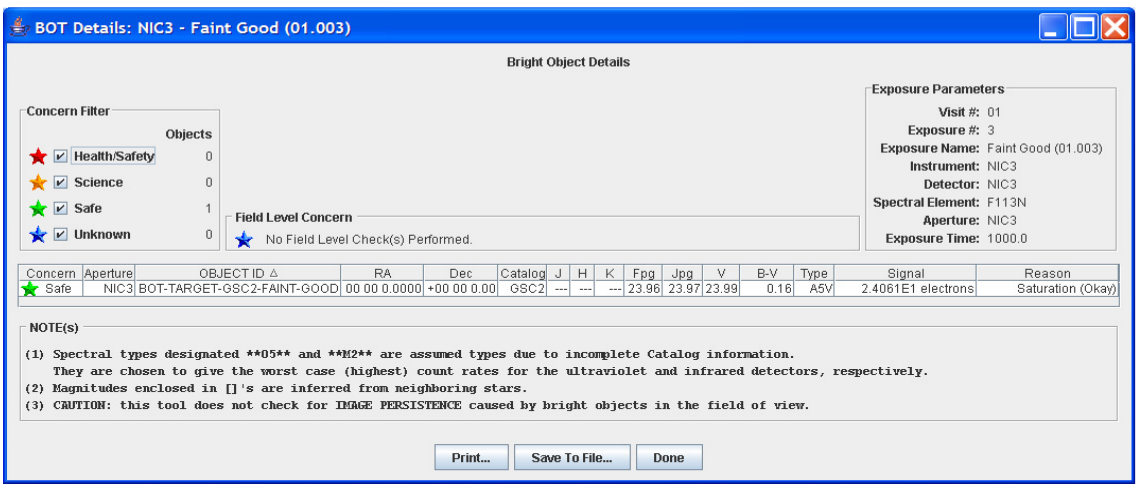

Figure 4-22: $V < 24.0$

Exposure 4:

Instrument: NIC3

Target: BOT-TARGET (F=23.98, J=23.97)

F and J values are used to define V since V and $B–V$ values are not in GSC2 for objects fainter than V=12.0 (See Bright Stars have V and $B–V$ in GSC2).

$$V = F + 0.03 + 0.44 \times (J - F) - 0.03 \times (J - F)^2 + 0.02 \times (J - F)^3$$

$$V = 23.98 + 0.03 + 0.44 \times (23.97 - 23.98) - 0.03 \times (23.97 - 23.98)^2 + 0.02 \times (23.97 - 23.98)^3$$

$$V = 24.01 + 0.44 \times (-0.01) - 0.03 \times (-0.01)^2 + 0.02 \times (-0.01)^3$$

$$V = 24.01 + 0.0044 - 0.03 \times 0.0001 + 0.02 \times 0.000001$$

$$V = 24.0056 - 0.000003 + (-0.00000002)$$

$$V \approx 24.006 < 24.0$$

The BOT considers the object as faulty since $V > 24.0$ (see Figure 4-23).

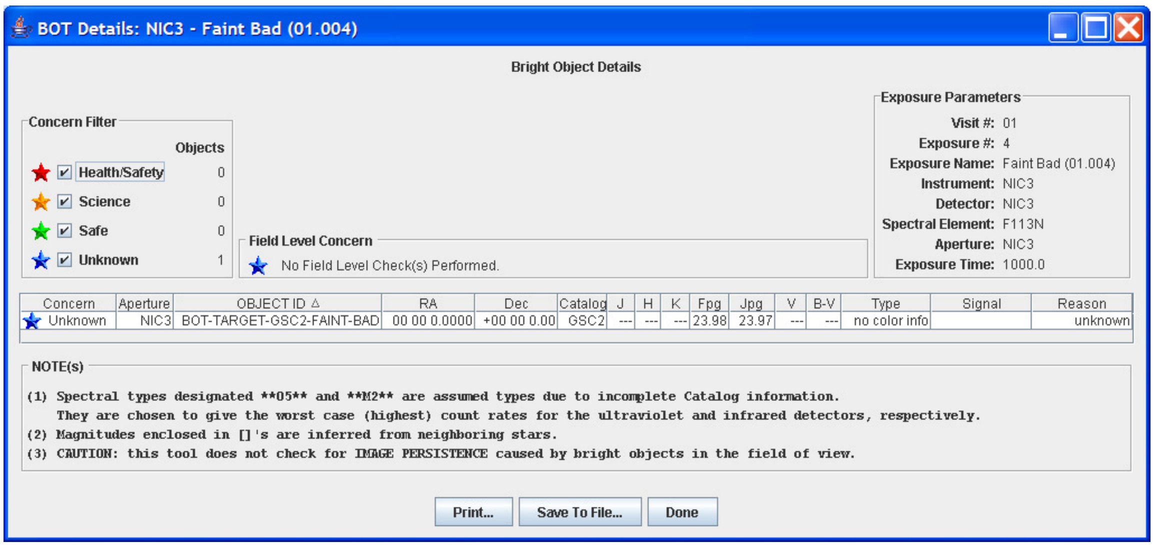

Figure 4-23: *V* > 24.0 and listed as unknown

4.3.2 Illegal *B–V*

This proposal will test that for any *B–V* value bluer (less) than -0.5 or redder (greater) than 3.0, the photometry is faulty and should not be used. These object types will be listed as 'no color info' and spectral elements will be listed as 'unknown' in the BOT details dialog. This proposal will use four exposures with targets to test four cases of *B–V* values, one slightly inside and outside each bound.

Exposure 1:

Instrument: ACS/SBC

Target: BOT-TARGET (F=15.0, J=19.27)

F and *J* values are used to define *B–V* since *V* and *B–V* values are not in GSC2 for objects fainter than *V*=12.0 (See Bright Stars have *V* and *B–V* in GSC2).

$$B - V = 0.158 + 0.665 \times (J - F)$$
$$B - V = 0.158 + 0.665 \times (19.27 - 15.0)$$
$$B - V = 0.158 + 0.665 \times (4.27)$$
$$B - V = 0.158 + 2.83955$$

$$B - V \approx 2.998 < 3.0$$

The BOT does not consider the object as faulty since $B - V < 3.0$ (see Figure 4-24).

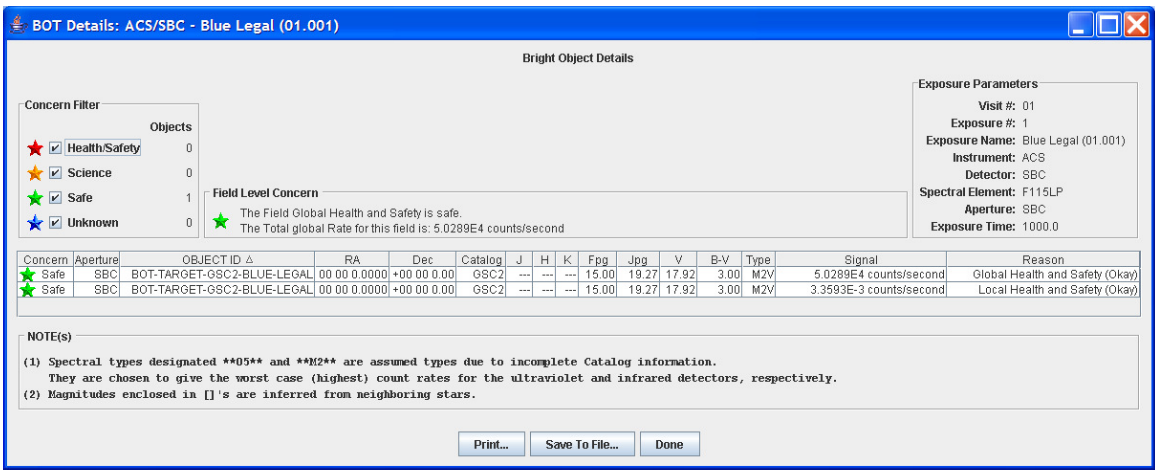

Figure 4-24: ***B–V*** **< 3.0**

Exposure 2:

Instrument: ACS/SBC

Target: BOT-TARGET (F=15.0, J=19.29)

F and *J* values are used to define B-V since *V* and *B–V* values are not in GSC2 for objects fainter than *V*=12.0 (See Bright Stars have *V* and *B–V* in GSC2).

$$B - V = 0.158 + 0.665 \times (J - F)$$
$$B - V = 0.158 + 0.665 \times (19.29 - 15.0)$$
$$B - V = 0.158 + 0.665 \times (4.29)$$
$$B - V = 0.158 + 2.85285$$

$$B - V \approx 3.011 > 3.0$$

The BOT considers the object as faulty since *B–V* >3.0 (see Figure 4-25).

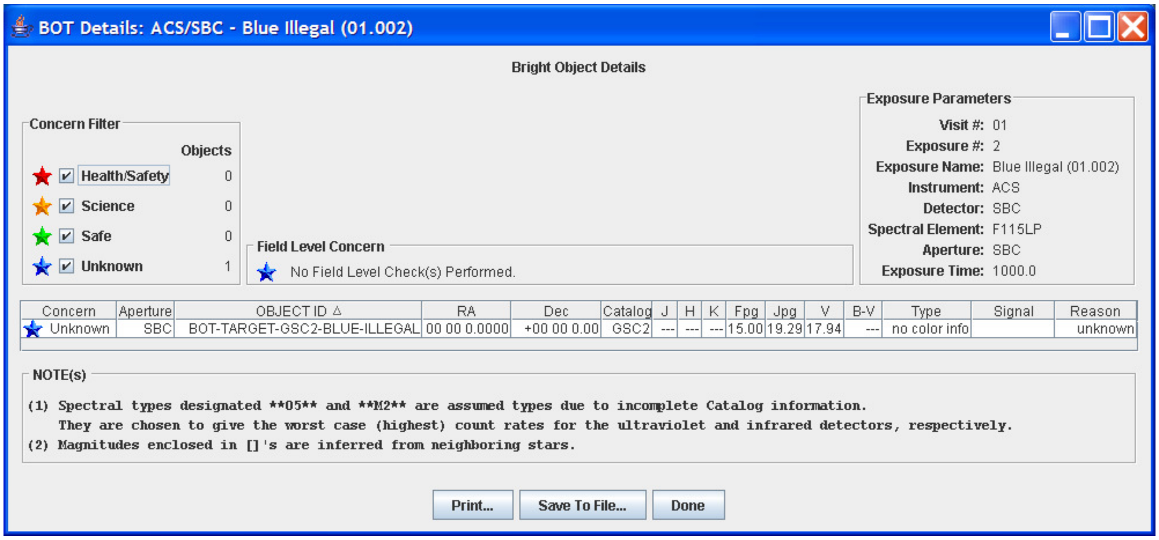

Figure 4-25: ***B–V* > 3.0 and listed as no color info**

Exposure 3:

Instrument: ACS/SBC

Target: BOT-TARGET (F=15.0, J=14.02)

F and J values are used to define $B–V$ since V and $B–V$ values are not in GSC2 for objects fainter than V=12.0 (See Bright Stars have V and $B–V$ in GSC2).

$$B-V = 0.158 + 0.665 \times (J - F)$$
$$B-V = 0.158 + 0.665 \times (14.02 - 15.0)$$
$$B-V = 0.158 + 0.665 \times (-0.98)$$
$$B-V = 0.158 + (-0.6517)$$

$$B-V \approx -0.494 > -0.5$$

The BOT does not consider the object as faulty since $B–V$ >-0.5 (see Figure 4-26).

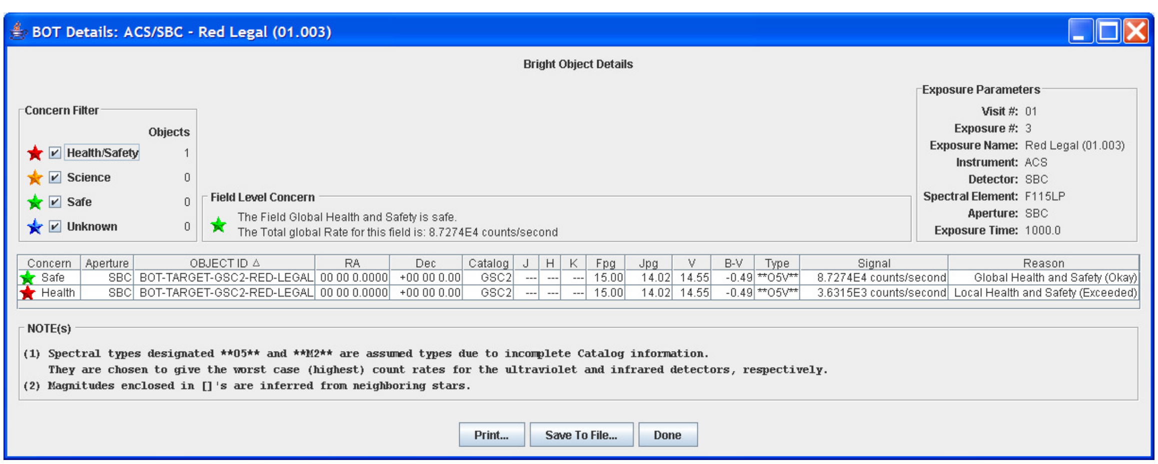

Figure 4-26: ***B–V* > -0.5**

Exposure 4:

Instrument: ACS/SBC

Target: BOT-TARGET (F=15.0, J=14.0)

F and *J* values are used to define *B–V* since *V* and *B–V* values are not in GSC2 for objects fainter than *V*=12.0 (See Bright Stars have *V* and *B–V* in GSC2).

$$B-V = 0.158 + 0.665 \times (J - F)$$
$$B-V = 0.158 + 0.665 \times (14.0 - 15.0)$$
$$B-V = 0.158 + 0.665 \times (-1.0)$$
$$B-V = 0.158 + (-0.665)$$

$$B-V \approx -0.507 < -0.5$$

The BOT considers the object as faulty since *B–V* <-0.5 (see Figure 4-27).

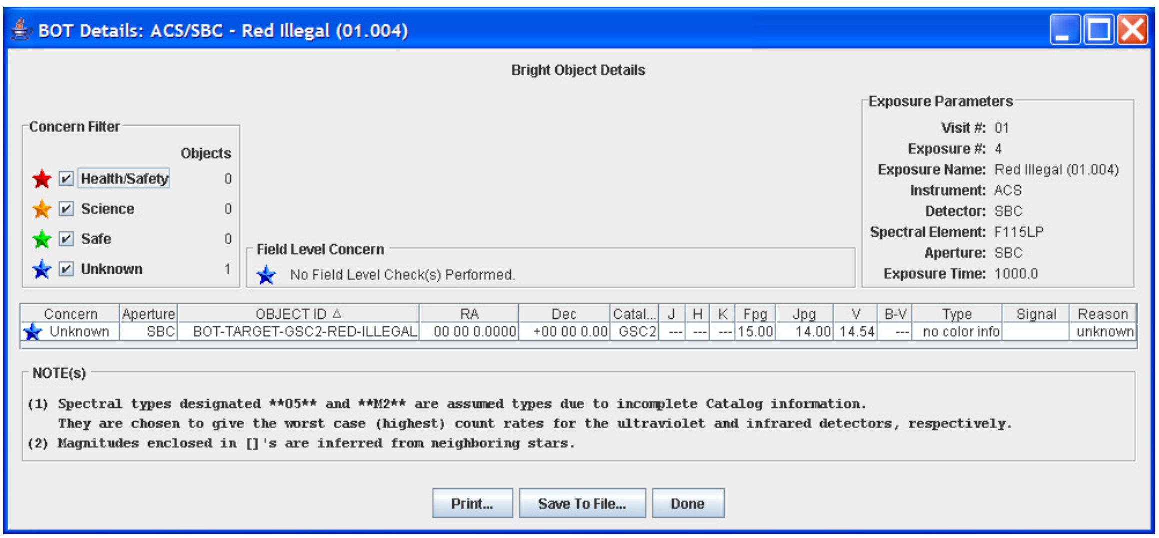

Figure 4-27: *B–V* < -0.5 and listed as no color info

4.3.3 Incomplete Data

This proposal will test that BOT correctly handles incomplete data, i.e. if only *F* is specified in the target. Since one case will suffice, the proposal contains one exposure with one target where only *F* is specified. The BOT details dialog will display *F*, *V*, *B–V* (*V* and *B–V* are shown only if present in the GSC2), the reason as "unknown," *F* as GSC2 value, and spectral type as "unknown" (See Figure 4-28).

Exposure 1:

Instrument: ACS/WFC

Target: BOT-TARGET (F=15.0)

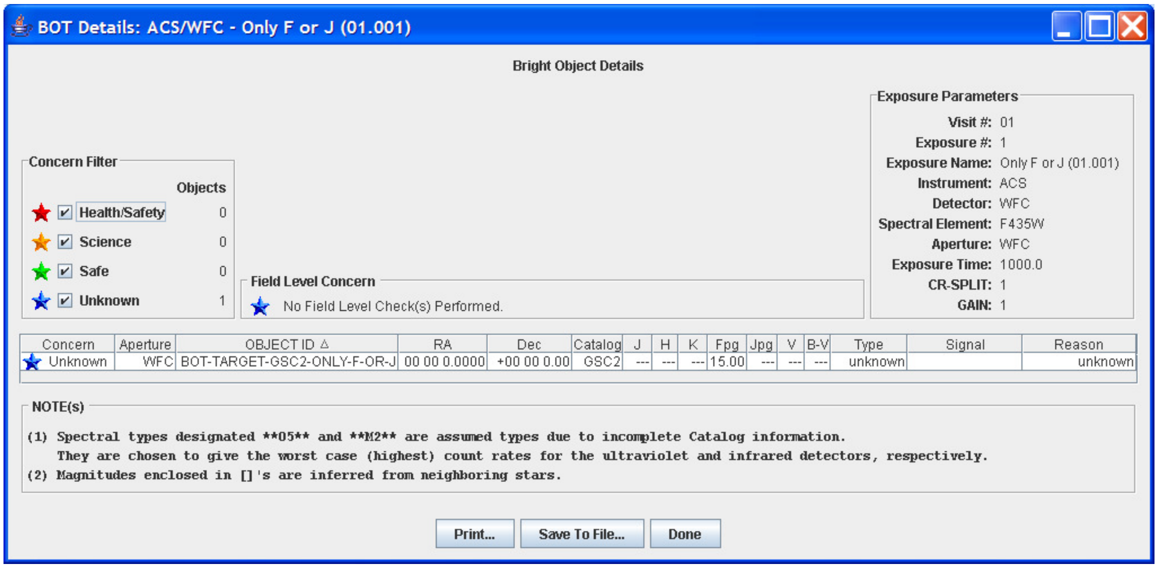

Figure 4-28: Only *F* Defined and listed as unknown

5.0 Trigger Values

This proposal will test the trigger values for the local limit and the global limit. Two real targets are used for two exposures.

The global count rate limit for STIS/FUV-MAMA is 200,000 and the local count rate limit is 100. The saturation for the global count rate is 65,536 electrons.

Exposure 1:

Instrument/Detector: STIS/FUV-MAMA

Target: G-191-B2B (RA: 05 05 28.0305 Dec: +52 49 8.52)

The object NAP9021544 in the BOT results exceeds the local limit:

$$7.8182E2 = 781.82 > 100\ counts/second$$
$$7.8182E5 = 781{,}820 > 65{,}536\ electrons$$

The table below displays the object data taken from the VOT file.

Object ID	RA	Dec	Signal	Reason
NAP9021544	05 05 28.6230	+52 49 16.96	**7.8182E2 counts/second/ pixel**	**Local Health and Safety (Exceeded)**
NAP9021544	05 05 28.6230	+52 49 16.96	**7.8182E5 counts**	**Saturation (Exceeded)**

Table 5-1: VOT File Object Information, Local Limit Exceeded

Exposure 2:
Instrument/Detector: STIS/FUV-MAMA
Target: Messier 15

Object N2QO000908 exceeds the global limit:

$$2.2278E5 = 222{,}780 > 200{,}000\ \textit{counts/second}$$
$$7.1477E4 = 71{,}477 > 65{,}536\ \textit{electrons}$$

The table below displays the object data taken from the VOT file.

Object ID	**RA**	**Dec**	**Signal**	**Reason**
N2QO000908	21 30 8.4448	+12 16 14.47	2.227E5 counts/second	Global Health and Safety (Exceeded)

Table 5-2: VOT File Object Information, Global Limit Exceeded

Appendix A. Aladin Displays

1.0 Search Field

1.1 Detector Sizes

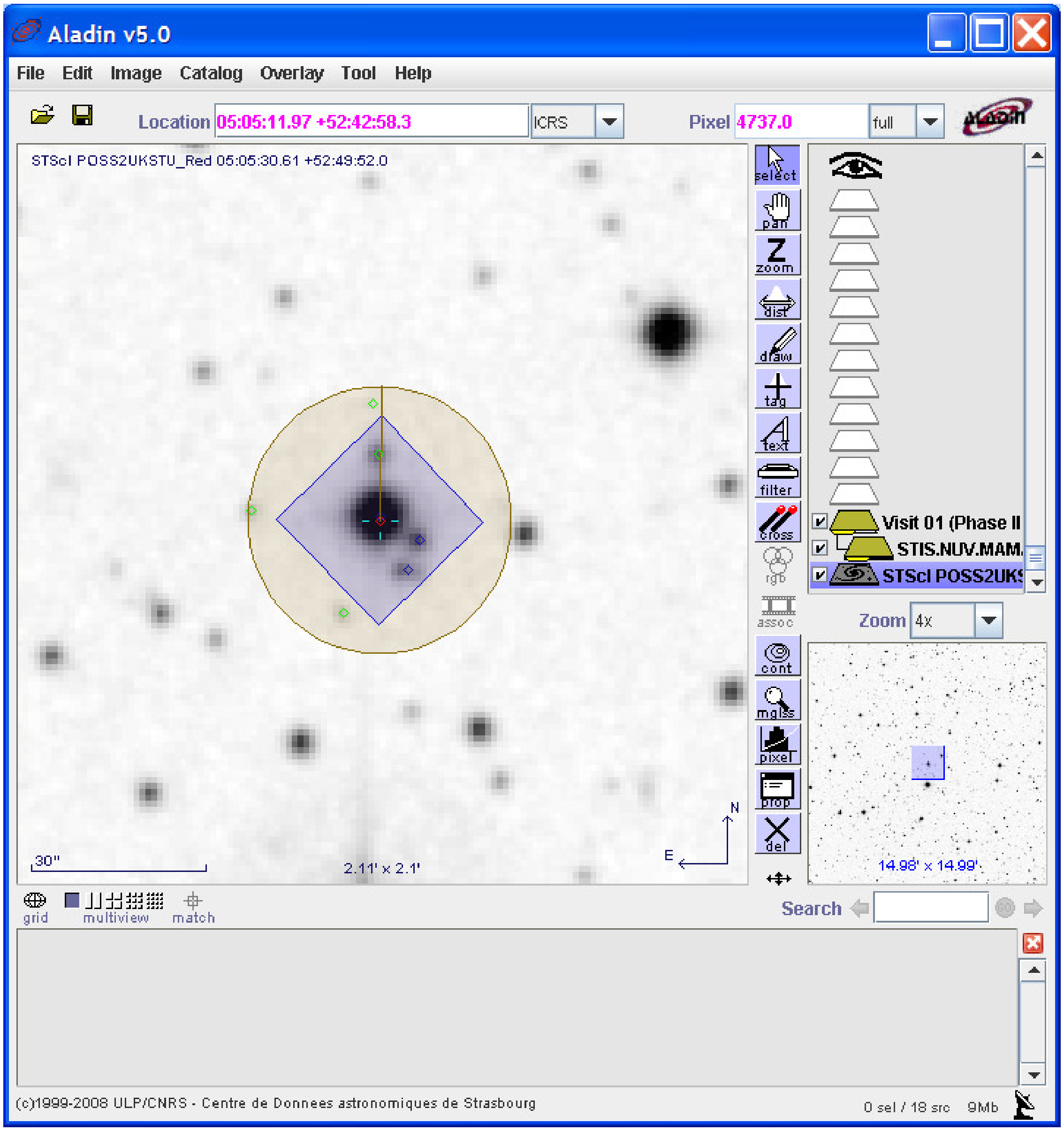

Figure 1-1: Detector Specific Sizes Aladin View

1.2 Adjustments

1.2.1 POS-TARG

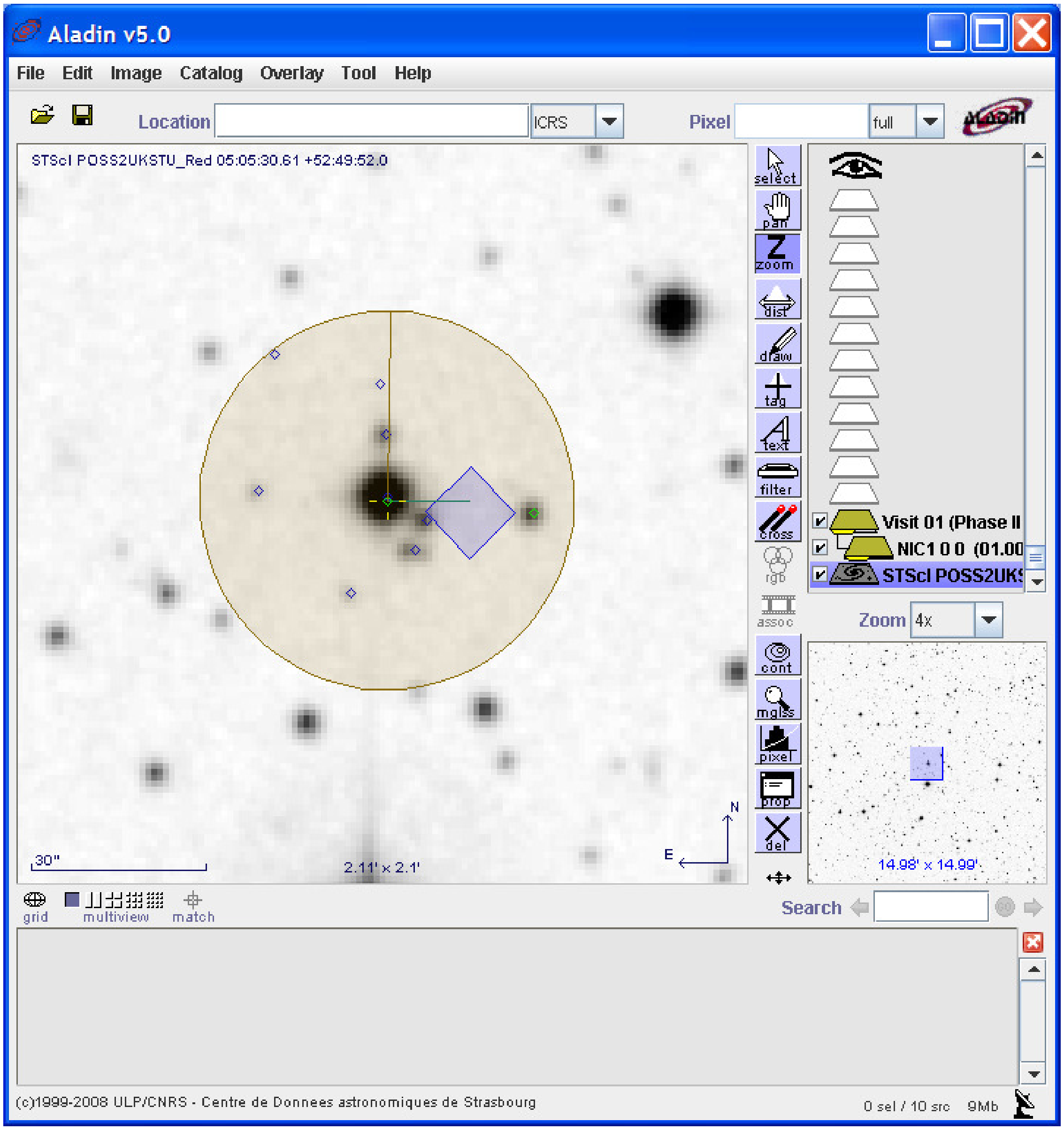

Figure 1-2: POS TARG Adjustment Aladin View

1.2.2 PATTERN

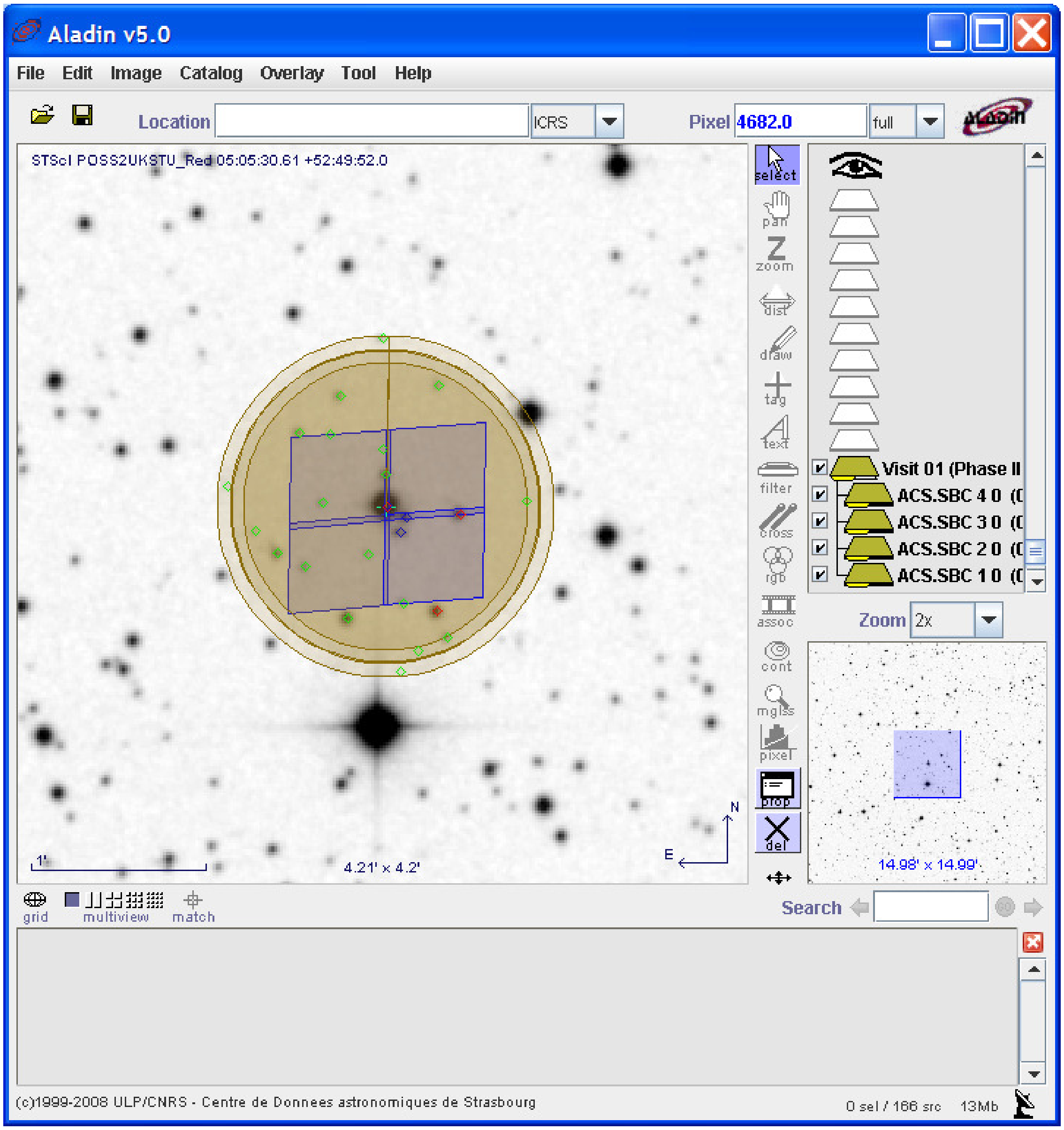

Figure 1-3: Pattern Adjustment Aladin View

1.2.3 Parallel

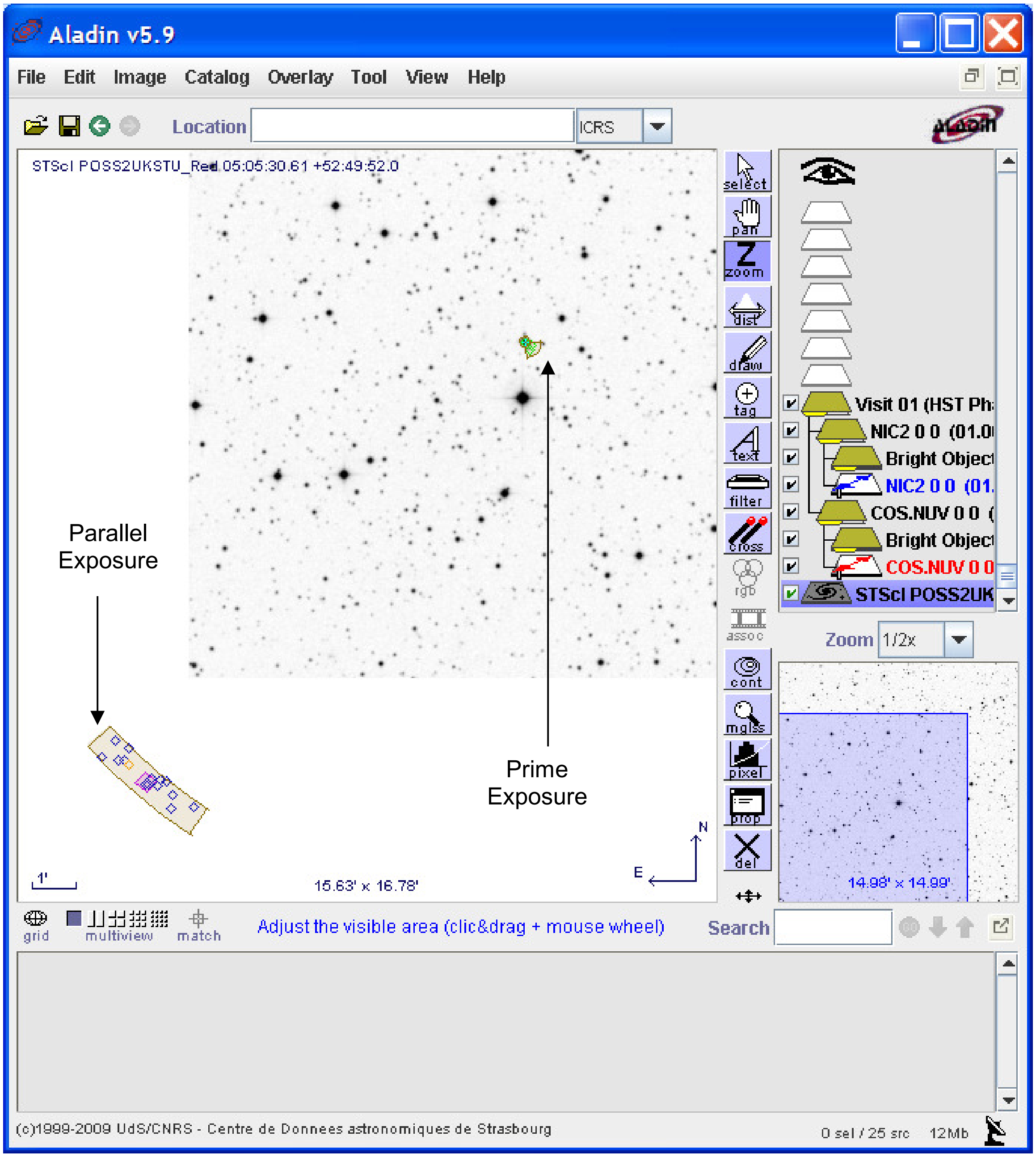

Figure 1-4: Prime and Parallel Exposures in Aladin View

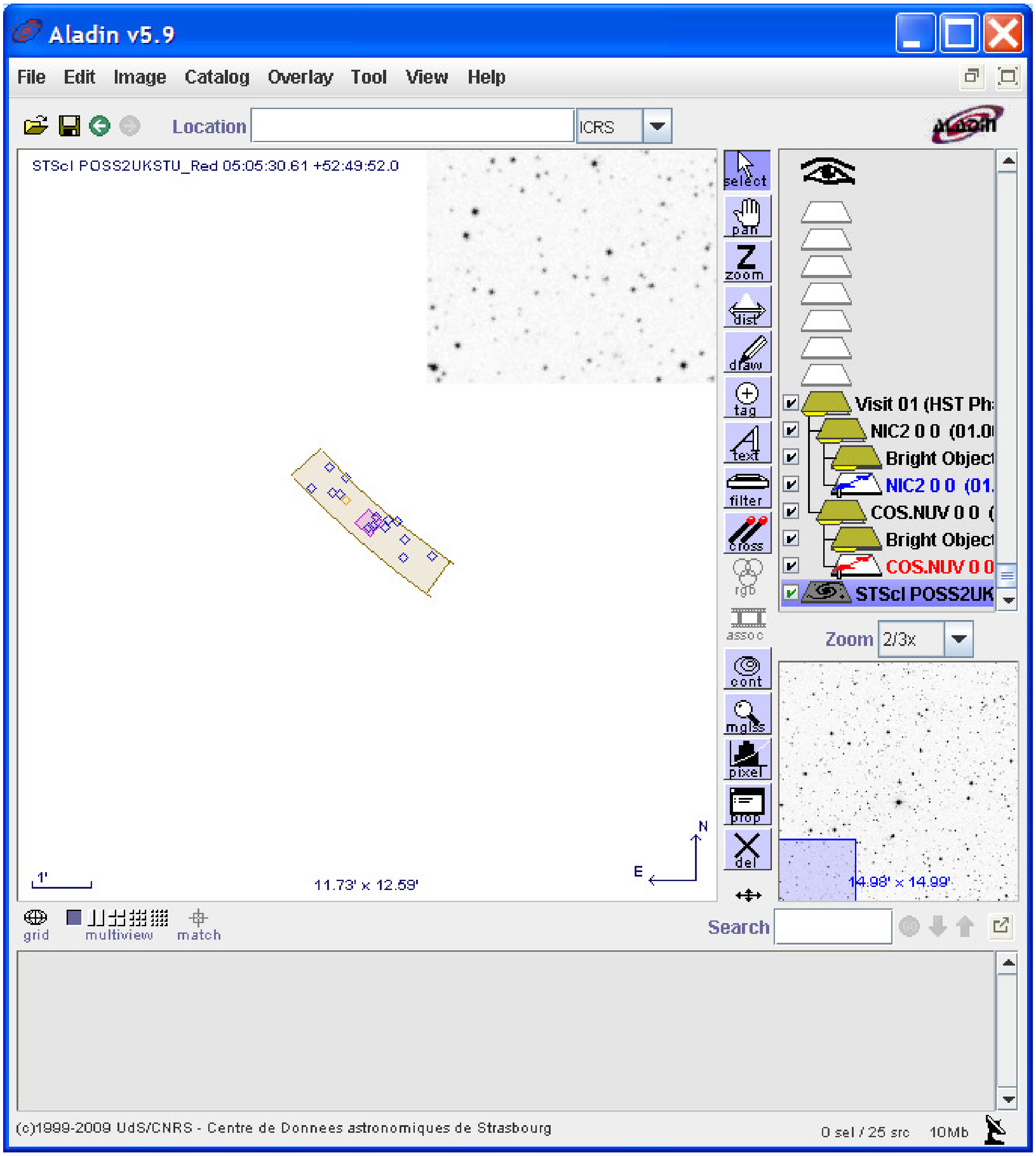

Figure 1-5: Parallel Exposure in Aladin View

1.2.4 COS Dual Aperture

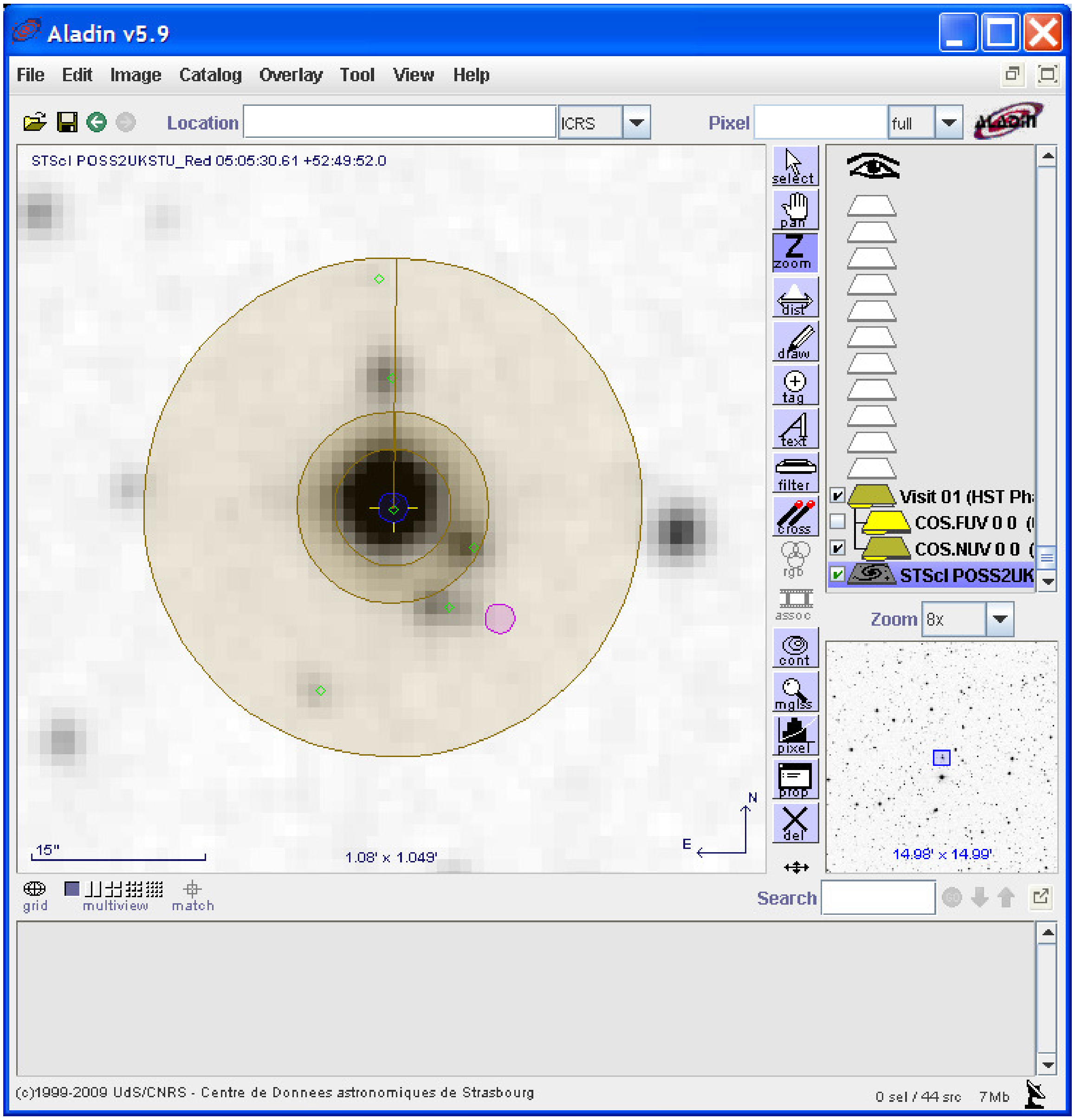

Figure 1-6: COS/NUV Exposure in Aladin View

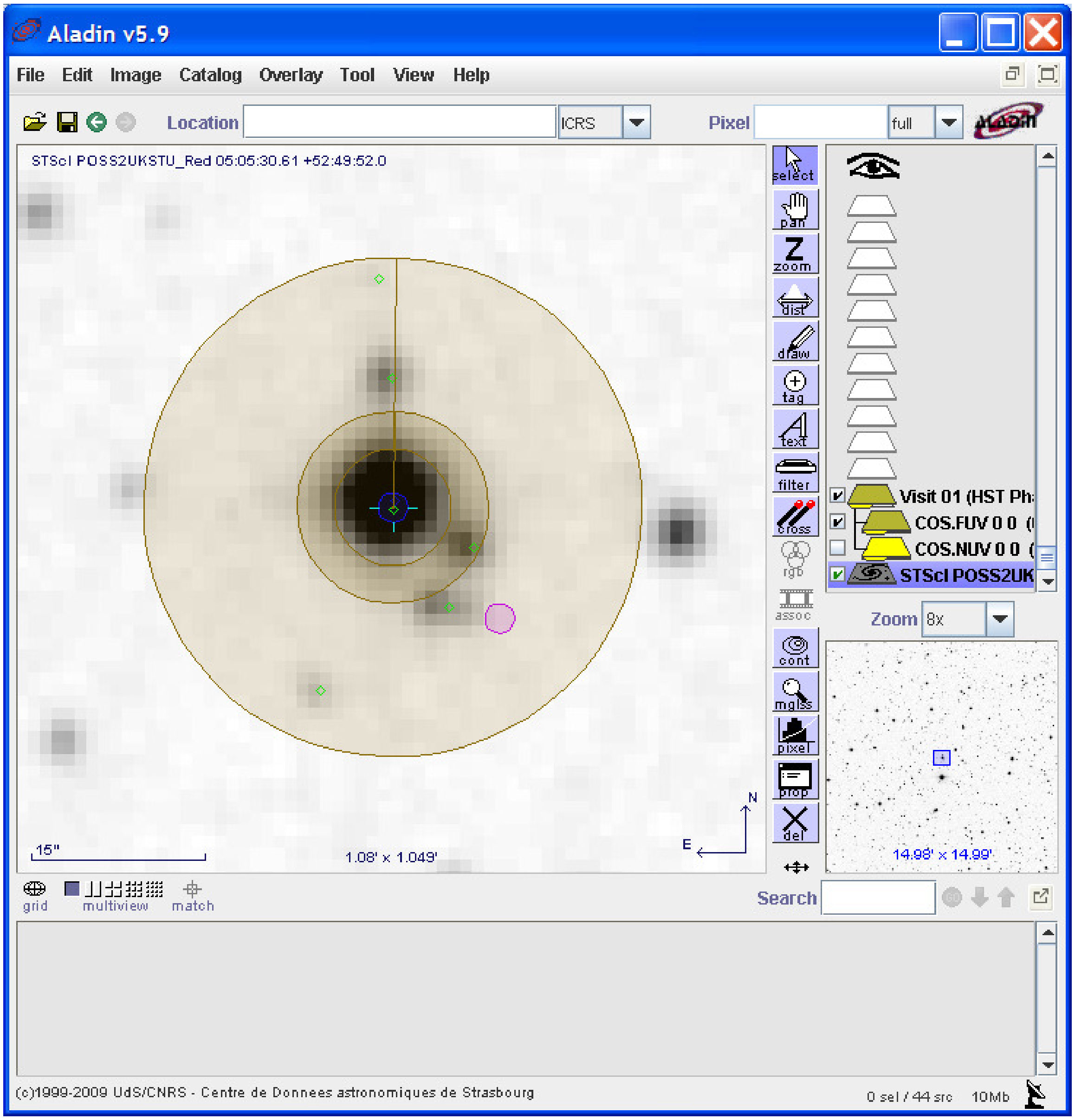

Figure 1-7: COS/FUV Exposure in Aladin View