WFC Acceptance Testing

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Summary

A detailed acceptance test for the WFC has been performed. A regression test shows that BOT is giving the correct answers. The new features (exposure expansion, pointing adjustments, actual duration usage, and visualization) are all functioning properly, and BOT can handle error conditions gracefully and provides meaningful feedback to the users.

There is one outstanding issue for the WFC. The optional parameters GAIN and CR-SPLIT, which appear in the details page for an exposure, are not included when you save that page to a file.

Three issues with the Aladin display have been found – a slight misalignment of the BOT overlay with the DSS image, a failure to display all sub-exposures, and a broken link in the Aladin spreadsheet; all of these are known issues with PRs or DRs previously filed.

BOT can be released to the community for the WFC once all sub-exposures are displayed in Aladin, and the optional parameters are included when the details page is saved to a file.

Introduction

For this test, the following target and exposure was used:

Target: FY Com – 12h 49m 16.0s, +27^{o} 25’ 22.00”

Exposure: ACS/WFC, ACCUM, F555W, WFC, 500s, CR-SPLIT=NO, GAIN=2

When appropriate, modifications to the exposure (e.g. POS TARG) are detailed below.

This target/exposure was used to perform the following:

Test	Definition
Regression	Comparison with old VTT/BOT
New features	Exposure expansion, pointing adjustment, actual duration, visualization
Exception Handling	Unsupported exposure (network query and cancel operations were performed with the ACS/SBC, Bad Exposure with the ACS/HRC)

For certain tests, both the tabular and graphic output products are included for ease of comparison with future test results.

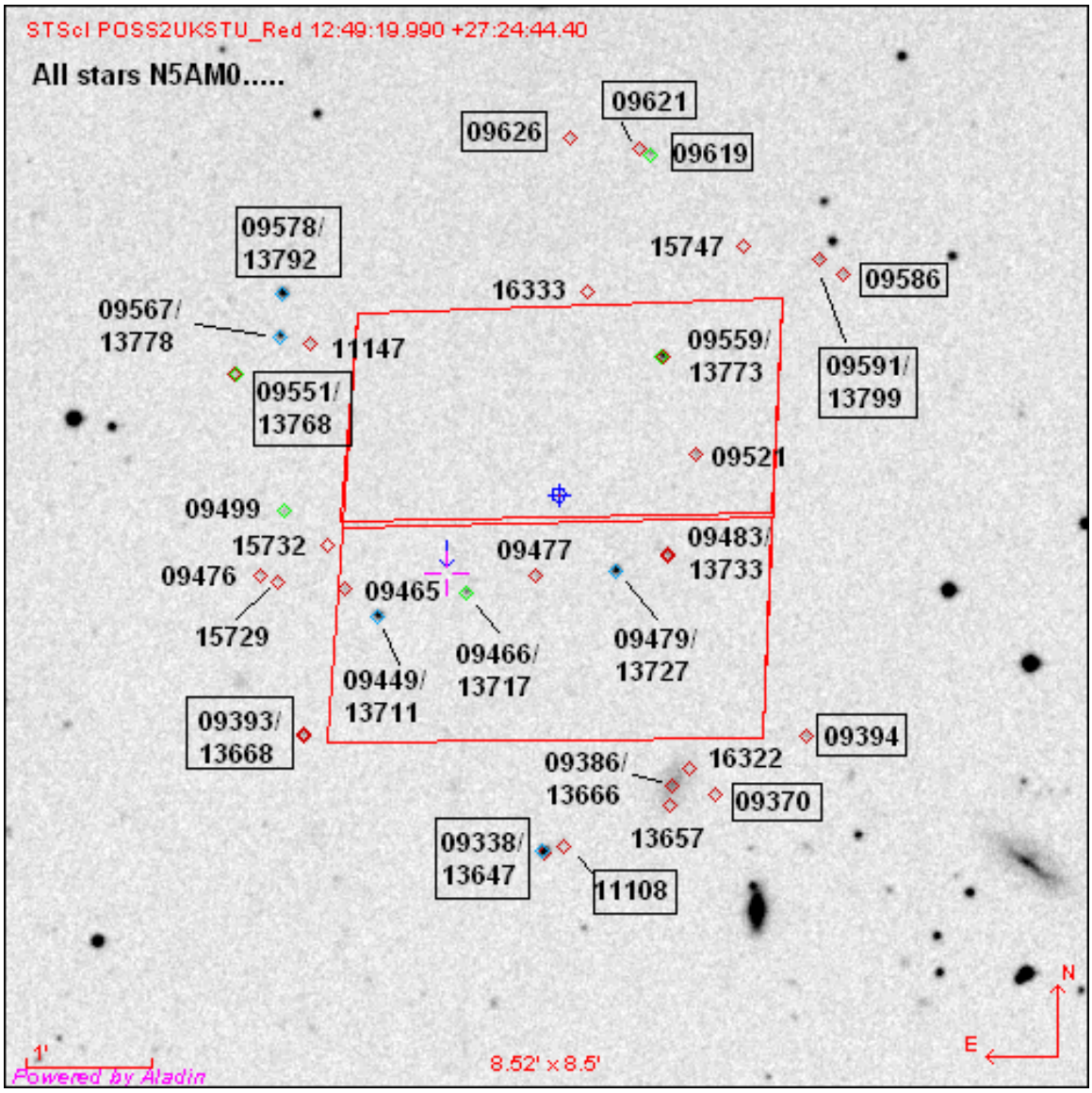
Regression Test

The test exposure was run through both the VTT/BOT and the new BOT/Aladin interface. The VTT/BOT used a search radius of 156", while the BOT/Aladin used 169.66". This resulted in 17 additional stars being found with the new BOT interface; the magnitudes and derived count rates were identical for the overlapping objects. The 43 objects detected (5 science, 5 safe, and 33 unknown) were:

GSC2 ID	RA (12 49)	Dec (+27)	F	J	V	B-V	Type	VTT	New
N5AM009386	11.893	23 6.54	15.67	16.03	---	---	not a star	Y	Y
N5AM009449	22.3785	24 23.88	17.62	18.95	18.23	0.58	F5V	Y	Y
N5AM009465	23.5631	24 36.00	20.01	---	---	---	no color info	Y	Y
N5AM009466	19.2611	24 35.48	19.02	19.8	19.39	0.17	A5V	Y	Y
N5AM009476	26.5252	24 42.27	19.82	---	---	---	not a star	Y	Y
N5AM009477	16.7884	24 43.86	19.95	21.45	---	---	not a star	Y	Y
N5AM009479	13.9969	24 46.83	17.52	18.24	17.86	0.15	A5V	Y	Y
N5AM009483	12.167	24 54.89	19.05	20.74	---	---	not a star	Y	Y
N5AM009499	25.7408	25 12.28	19.98	21.13	20.51	0.29	A5V	Y	Y
N5AM009521	11.1827	25 41.84	20	---	---	---	no color info	Y	Y
N5AM009559	12.4544	26 27.95	18.29	20.52	19.37	1.17	K4V	Y	Y
N5AM009567	25.9866	26 34.76	18.17	18.8	18.47	0.09	**O5V**	Y	Y
N5AM011147	24.9044	26 31.78	---	20.99	---	---	no color info	Y	Y
N5AM013657	11.9096	22 56.69	20.14	---	---	---	not a star	Y	Y
N5AM013666	11.8557	23 6.42	16.74	---	---	---	not a star	Y	Y
N5AM013711	22.3738	24 23.54	17.64	---	---	---	no color info	Y	Y
N5AM013717	19.2563	24 35.22	18.84	---	---	---	no color info	Y	Y
N5AM013727	13.9914	24 46.49	17.56	---	---	---	no color info	Y	Y
N5AM013733	12.1407	24 54.23	18.8	---	---	---	not a star	Y	Y
N5AM013773	12.4439	26 27.60	18.21	---	---	---	no color info	Y	Y
N5AM013778	25.9847	26 34.51	18.32	---	---	---	no color info	Y	Y
N5AM015729	25.8877	24 38.91	---	---	---	---	not a star	Y	Y
N5AM015732	24.1946	24 57.03	---	---	---	---	no color info	Y	Y
N5AM015747	9.6096	27 20.60	---	---	---	---	not a star	Y	Y
N5AM016322	11.2804	23 14.65	---	---	---	---	not a star	Y	Y
N5AM016333	15.1485	26 58.10	---	---	---	---	no color info	Y	Y
N5AM009338	16.4023	22 34.09	16.63	17.28	16.94	0.1	A1V	N (168.0")	Y
N5AM009370	10.3285	23 2.50	20.43	---	---	---	not a star	N (158.7")	Y
N5AM009393	24.9463	23 27.46	19.85	21.59	---	---	not a star	N (165.5")	Y
N5AM009394	7.1927	23 30.36	19.82	---	---	---	not a star	N (162.2")	Y
N5AM009578	25.9172	26 54.79	17.11	18.13	17.58	0.35	F0V	N (161.7")	Y
N5AM009586	6.1054	27 7.67	19.97	---	---	---	not a star	N (169.2")	Y
N5AM009591	6.9386	27 14.81	19.36	20.42	---	---	not a star	N (165.4")	Y
N5AM009619	12.9793	28 2.66	19.11	21.16	20.09	0.93	K0V	N (165.6")	Y
N5AM009621	13.3312	28 5.55	20.29	---	---	---	not a star	N (167.4")	Y
N5AM009626	15.8143	28 10.35	20.41	---	---	---	not a star	N (168.4")	Y
N5AM011108	15.7105	22 36.82	---	20.5	---	---	not a star	N (165.2")	Y
N5AM013647	16.3875	22 33.77	16.74	---	---	---	no color info	N (168.3")	Y
N5AM013768	27.5264	26 16.91	20.08	---	---	---	not a star	N (163.4")	Y
N5AM013792	25.9122	26 54.55	17.11	---	---	---	no color info	N (161.5")	Y
N5AM013799	6.9263	27 14.48	19.07	---	---	---	not a star	N (165.3")	Y
N5AM009551	27.5242	26 16.25	20.13	20.87	20.48	0.02	**O5V**	N (163.2")	Y
N5AM013668	24.9388	23 26.70	19.61	---	---	---	no color info	N (166.0")	Y

The 17 stars that were only found by the new BOT were all located between 158.7” and 169.2” from the center of the aperture, and are therefore due to the increase in the search radius.

The field map, showing the objects found, is given below.



In the figure, all objects were found by the VTT/BOT except the ones in the boxes (described above).

Issue

There appears to be a slight misalignment between the BOT overlay and the DSS image, which is 0.2” in both RA and Dec. The RA offset is consistent (the BOT overlay is always east of the star), while the Dec offset is sometimes north and sometimes south.

This discrepancy is small enough (0.2 pixels) to be of no concern, but is covered under APT-VTT DR 1170.

There are two optional parameters – GAIN and CR-SPLIT – that impact the BOT results, and these are displayed in the details page for an exposure. However, they should also be included when you save the results to a file; this is covered in APT-BOT PR 56382.

New Features

Exposure Expansion

For the HRC, there are three ways for exposures to be expanded – use of the CR-SPLIT optional parameter, number of iterations greater than 1, and the use of a pattern; it is also possible to combine these methods (i.e. CR-SPLIT and pattern). The following cases were tested:

CR-SPLIT	Num. of Iter.	Pattern	Number of sub-exposures	Original Exp. Time	Exp.Time Predicted	Exp. Time Used by BOT
NO (=1)	1	no	1	500s	500s	500s
DEF (=2)	1	no	2	500s	250s	250s
3	1	no	3	500s	166.666s	166.666s
NO (=1)	3	no	3	500s	500s	500s
NO (=1)	1	yes	4x1	500s	500s	500s
DEF (=2)	1	yes	3x2	500s	250s	250s

In each case, BOT created the correct number of sub-exposures, and modified the given exposure time correctly. As with the SBC, Aladin did display the BOT overlays, although there was only 1 image plane shown for the CR-SPLIT and number of iterations cases, unlike the Pattern case where each sub-exposure was its own plane. Since the CR-SPLIT and number of iterations planes would all be, by definition, identical, showing only 1 plane is acceptable (however, if the actual duration field was used, a problem could result).

Pointing Adjustment

There are 3 different types of pointing adjustments valid for the HRC – POS TARG, PATTERN, and use as a PARALLEL instrument.

POS TARG

For this test, the standard exposure was modified by adding a POS TARG of X=-40” and Y=-40”. The direction of the POS TARG is important in this test, and in order to be able to simply predict the size of the POS TARG motion, the motion must be in the same direction as the "Search Radius Vector" which is defined as the point from the fiducial to the outermost corner of the Aperture; for the WFC this is the lower left corner. A

selection in a different direction makes the calculation of the motion vector more complicated.

The test exposure was run through both the VTT/BOT and the new BOT/Aladin interface. The VTT/BOT used a search radius of 156", and only did analysis at the exact pointing (i.e. it assumed ORIENT=0). The new BOT increased the search radius by 50" (40" for the POS TARG, 10" for the larger search radius) to 206", which resulted in a circle being analyzed to support any possible ORIENT value. Based on the size of the POS TARG, this increase in search radius was less than the predicted value (i.e. SQRT(40*40 + 40*40) = 56.5), which implies that the direction of the POS TARG was not properly aligned. I then ran a series of POS TARGs from 10"-50" in steps of 10", and the increase in search radius was 13.8" each time, very close to the predicted value of SQRT(10*10 + 10*10) = 14.1", so it appears the search radius is being properly incremented for POS TARGs.

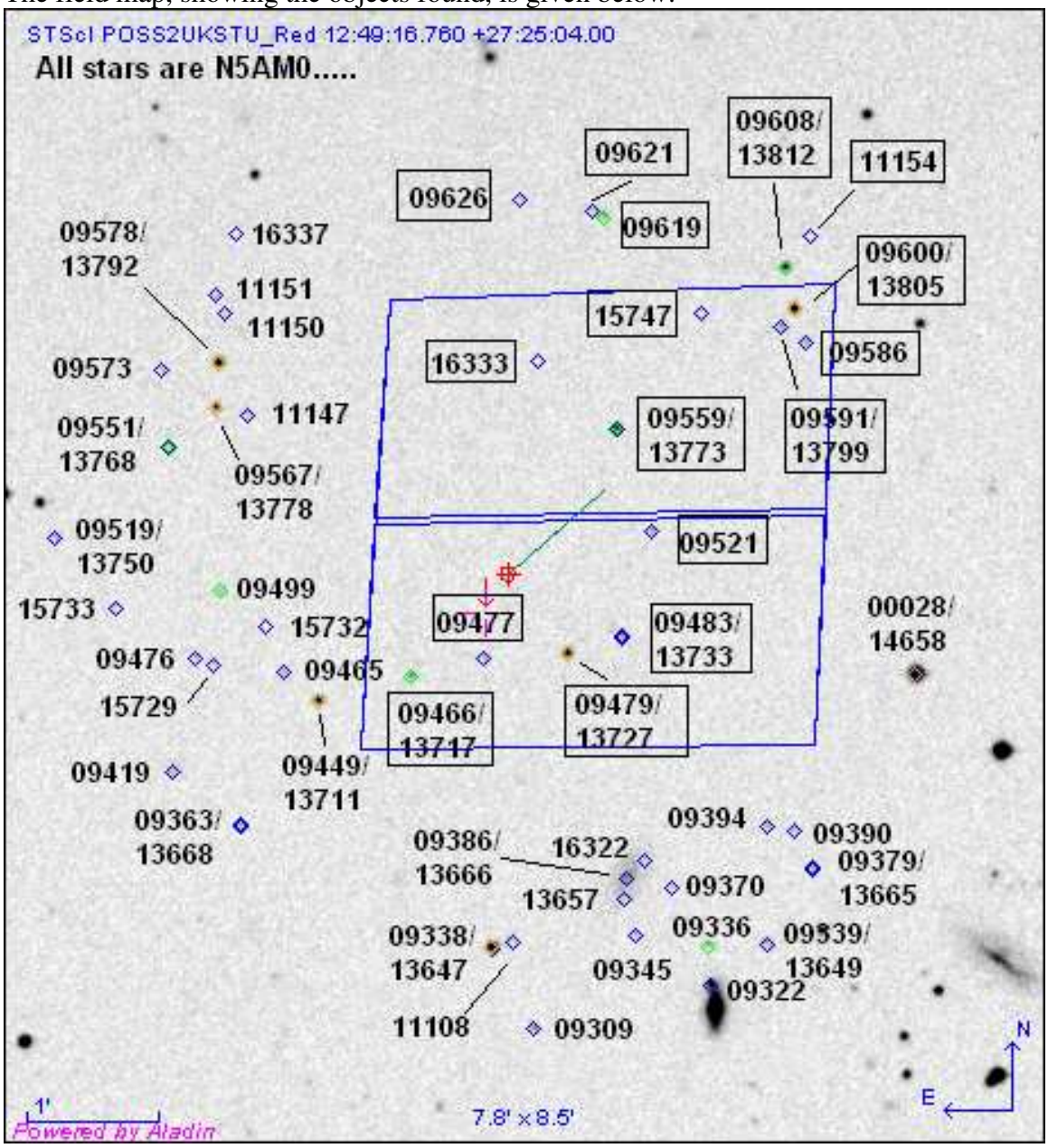
With the increased search radius, the new BOT analyzed more objects than the VTT/BOT, but all objects in the VTT/BOT were detected, and for those objects, the magnitudes and derived count rates were identical.

The 67 objects detected (7 science, 7 safe, and 53 unknown) were:

GSC2 ID	RA (12 49)	Dec (+27)	F	J	V	B-V	Type
N5AM009466	19.2611	24 35.48	19.02	19.8	19.39	0.17	A5V
N5AM009477	16.7884	24 43.86	19.95	21.45	---	---	not a star
N5AM009479	13.9969	24 46.83	17.52	18.24	17.86	0.15	A5V
N5AM009483	12.167	24 54.89	19.05	20.74	---	---	not a star
N5AM009521	11.1827	25 41.84	20	---	---	---	no color info
N5AM009559	12.4544	26 27.95	18.29	20.52	19.37	1.17	K4V
N5AM009586	6.1054	27 7.67	19.97	---	---	---	not a star
N5AM009591	6.9386	27 14.81	19.36	20.42	---	---	not a star
N5AM009600	6.5297	27 22.88	17.12	18.39	17.7	0.54	F5V
N5AM009608	6.8527	27 41.53	17.85	19.23	18.48	0.6	F5V
N5AM009619	12.9793	28 2.66	19.11	21.16	20.09	0.93	K0V
N5AM009621	13.3312	28 5.55	20.29	---	---	---	not a star
N5AM009626	15.8143	28 10.35	20.41	---	---	---	not a star
N5AM011154	5.9726	27 55.77	---	21.2	---	---	not a star
N5AM013717	19.2563	24 35.22	18.84	---	---	---	no color info
N5AM013727	13.9914	24 46.49	17.56	---	---	---	no color info
N5AM013733	12.1407	24 54.23	18.8	---	---	---	not a star
N5AM013773	12.4439	26 27.60	18.21	---	---	---	no color info
N5AM013799	6.9263	27 14.48	19.07	---	---	---	not a star
N5AM013805	6.5213	27 22.63	17.11	---	---	---	no color info
N5AM013812	6.8269	27 41.25	18.02	---	---	---	not a star
N5AM015747	9.6096	27 20.60	---	---	---	---	not a star
N5AM016333	15.1485	26 58.10	---	---	---	---	no color info
N5AM016337	25.4051	27 53.17	---	---	---	---	no color info

N5AM000028	2.234	24 39.23	14.33	16.6	15.44	1.22	K4V
N5AM009309	14.9487	21 57.69	19.12	---	---	---	no color info
N5AM009322	9.0058	22 19.03	16.62	18.62	---	---	not a star
N5AM009336	9.0929	22 36.23	19.28	21.68	20.47	1.1	K0V
N5AM009338	16.4023	22 34.09	16.63	17.28	16.94	0.1	A1V
N5AM009339	7.1245	22 37.93	19.35	20.2	---	---	not a star
N5AM009345	11.5723	22 40.84	20	---	---	---	not a star
N5AM009370	10.3285	23 2.50	20.43	---	---	---	not a star
N5AM009379	5.5911	23 12.02	19.36	21.04	---	---	not a star
N5AM009386	11.893	23 6.54	15.67	16.03	---	---	not a star
N5AM009390	6.2365	23 28.80	20.03	21.14	---	---	not a star
N5AM009393	24.9463	23 27.46	19.85	21.59	---	---	not a star
N5AM009394	7.1927	23 30.36	19.82	---	---	---	not a star
N5AM009419	27.2531	23 51.21	19.46	20.97	---	---	not a star
N5AM009449	22.3785	24 23.88	17.62	18.95	18.23	0.58	F5V
N5AM009465	23.5631	24 36.00	20.01	---	---	---	no color info
N5AM009476	26.5252	24 42.27	19.82	---	---	---	not a star
N5AM009499	25.7408	25 12.28	19.98	21.13	20.51	0.29	A5V
N5AM009519	31.3194	25 34.86	19.69	20.65	---	---	not a star
N5AM009551	27.5242	26 16.25	20.13	20.87	20.48	0.02	**O5V**
N5AM009567	25.9866	26 34.76	18.17	18.8	18.47	0.09	**O5V**
N5AM009573	27.8078	26 51.17	20.18	---	---	---	not a star
N5AM009578	25.9172	26 54.79	17.11	18.13	17.58	0.35	F0V
N5AM011108	15.7105	22 36.82	---	20.5	---	---	not a star
N5AM011147	24.9044	26 31.78	---	20.99	---	---	no color info
N5AM011150	25.7057	27 17.27	---	21.68	---	---	not a star
N5AM011151	26.0569	27 24.73	---	21.48	---	---	not a star
N5AM013647	16.3875	22 33.77	16.74	---	---	---	no color info
N5AM013649	7.1322	22 37.93	18.99	---	---	---	not a star
N5AM013657	11.9096	22 56.69	20.14	---	---	---	not a star
N5AM013665	5.6323	23 11.78	19.06	---	---	---	not a star
N5AM013666	11.8557	23 6.42	16.74	---	---	---	not a star
N5AM013668	24.9388	23 26.70	19.61	---	---	---	no color info
N5AM013711	22.3738	24 23.54	17.64	---	---	---	no color info
N5AM013750	31.3395	25 35.04	19.93	---	---	---	not a star
N5AM013768	27.5264	26 16.91	20.08	---	---	---	not a star
N5AM013778	25.9847	26 34.51	18.32	---	---	---	no color info
N5AM013792	25.9122	26 54.55	17.11	---	---	---	no color info
N5AM014658	2.1866	24 39.84	---	17.39	---	---	no color info
N5AM015729	25.8877	24 38.91	---	---	---	---	not a star
N5AM015732	24.1946	24 57.03	---	---	---	---	no color info
N5AM015733	29.2255	25 3.50	---	---	---	---	not a star
N5AM016322	11.2804	23 14.65	---	---	---	---	not a star

The field map, showing the objects found, is given below.



In the figure, the objects in boxes were found by the VTT/BOT. The new objects are all in the area that is expected.

Pattern

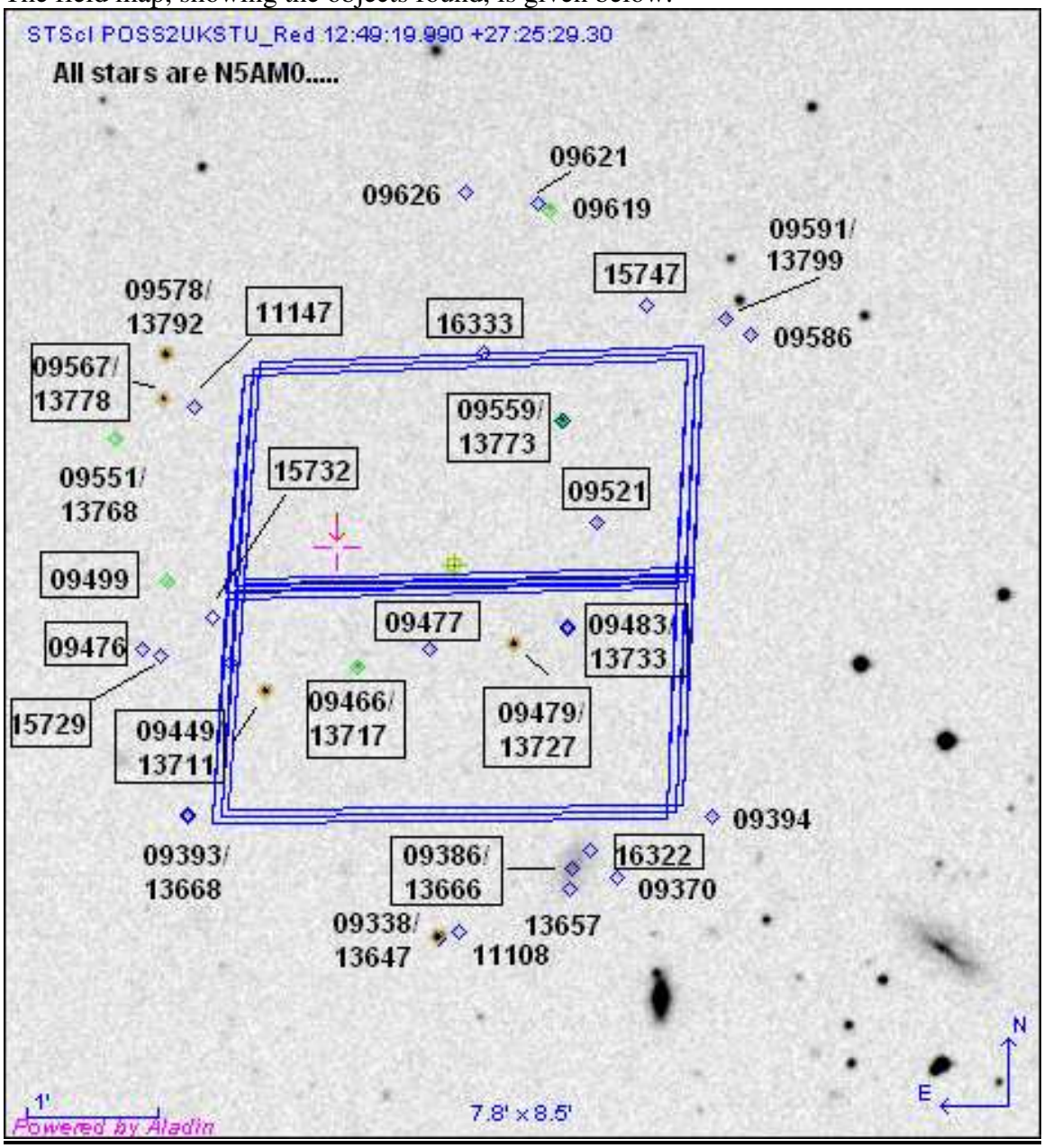
For this test, the standard exposure was modified by putting it in a PATTERN (a WFC-DITHER-LINE with 3 points with a 5" spacing at an orientation of 225^{o}). The orientation of the pattern is important in this test, since in order to be able to simply predict the size of the PATTERN motion, the motion must be in the same direction as the "Search Radius Vector" which is defined as the point from the fiducial to the outermost corner of the Aperture; for the WFC this is the lower left corner. A selection in a different orientation makes the calculation of the motion vector more complicated.

The test exposure was run through both the VTT/BOT and the new BOT/Aladin interface. The VTT/BOT used a search radius of 156", and only did analysis as if there were no pattern. The new BOT did 3 searches – one for the initial pointing (with the standard 169.8" search radius) and one for each of the two pattern points (with the search radius decreased to 164.4" and 159.6"); all objects in the initial pointing were included in the larger pattern pointing report, as expected. The expanded (in this case decreased) search radius was calculated to be 162.7" and 155.7" for the non-central pattern points; this was in error by 1.7" for each point (5.4" separation instead of 7.1"), which is an acceptable level of accuracy. With the increased search radius, the new BOT analyzed more objects than the VTT/BOT, but all objects in the VTT/BOT were detected, and for those objects, the magnitudes and derived count rates were identical.

The 43 objects detected (5 science, 5 safe, and 33 unknown) were:

GSC2 ID	RA (12 49)	Dec (+27)	F	J	V	B-V	Type
N5AM009338	16.4023	22 34.09	16.63	17.28	16.94	0.1	A1V
N5AM009370	10.3285	23 2.50	20.43	---	---	---	not a star
N5AM009386	11.893	23 6.54	15.67	16.03	---	---	not a star
N5AM009393	24.9463	23 27.46	19.85	21.59	---	---	not a star
N5AM009394	7.1927	23 30.36	19.82	---	---	---	not a star
N5AM009449	22.3785	24 23.88	17.62	18.95	18.23	0.58	F5V
N5AM009465	23.5631	24 36.00	20.01	---	---	---	no color info
N5AM009466	19.2611	24 35.48	19.02	19.8	19.39	0.17	A5V
N5AM009476	26.5252	24 42.27	19.82	---	---	---	not a star
N5AM009477	16.7884	24 43.86	19.95	21.45	---	---	not a star
N5AM009479	13.9969	24 46.83	17.52	18.24	17.86	0.15	A5V
N5AM009483	12.167	24 54.89	19.05	20.74	---	---	not a star
N5AM009499	25.7408	25 12.28	19.98	21.13	20.51	0.29	A5V
N5AM009521	11.1827	25 41.84	20	---	---	---	no color info
N5AM009551	27.5242	26 16.25	20.13	20.87	20.48	0.02	**O5V**
N5AM009559	12.4544	26 27.95	18.29	20.52	19.37	1.17	K4V
N5AM009567	25.9866	26 34.76	18.17	18.8	18.47	0.09	**O5V**
N5AM009578	25.9172	26 54.79	17.11	18.13	17.58	0.35	F0V
N5AM009586	6.1054	27 7.67	19.97	---	---	---	not a star
N5AM009591	6.9386	27 14.81	19.36	20.42	---	---	not a star
N5AM009619	12.9793	28 2.66	19.11	21.16	20.09	0.93	K0V
N5AM009621	13.3312	28 5.55	20.29	---	---	---	not a star
N5AM009626	15.8143	28 10.35	20.41	---	---	---	not a star
N5AM011108	15.7105	22 36.82	---	20.5	---	---	not a star
N5AM011147	24.9044	26 31.78	---	20.99	---	---	no color info
N5AM013647	16.3875	22 33.77	16.74	---	---	---	no color info
N5AM013657	11.9096	22 56.69	20.14	---	---	---	not a star
N5AM013666	11.8557	23 6.42	16.74	---	---	---	not a star
N5AM013668	24.9388	23 26.70	19.61	---	---	---	no color info
N5AM013711	22.3738	24 23.54	17.64	---	---	---	no color info
N5AM013717	19.2563	24 35.22	18.84	---	---	---	no color info
N5AM013727	13.9914	24 46.49	17.56	---	---	---	no color info
N5AM013733	12.1407	24 54.23	18.8	---	---	---	not a star
N5AM013768	27.5264	26 16.91	20.08	---	---	---	not a star
N5AM013773	12.4439	26 27.60	18.21	---	---	---	no color info
N5AM013778	25.9847	26 34.51	18.32	---	---	---	no color info
N5AM013792	25.9122	26 54.55	17.11	---	---	---	no color info
N5AM013799	6.9263	27 14.48	19.07	---	---	---	not a star
N5AM015729	25.8877	24 38.91	---	---	---	---	not a star
N5AM015732	24.1946	24 57.03	---	---	---	---	no color info
N5AM015747	9.6096	27 20.60	---	---	---	---	not a star
N5AM016322	11.2804	23 14.65	---	---	---	---	not a star
N5AM016333	15.1485	26 58.10	---	---	---	---	no color info

The field map, showing the objects found, is given below.



In the figure, the objects in boxes were found by the VTT/BOT. The new objects are all in the area that is expected.

Parallel

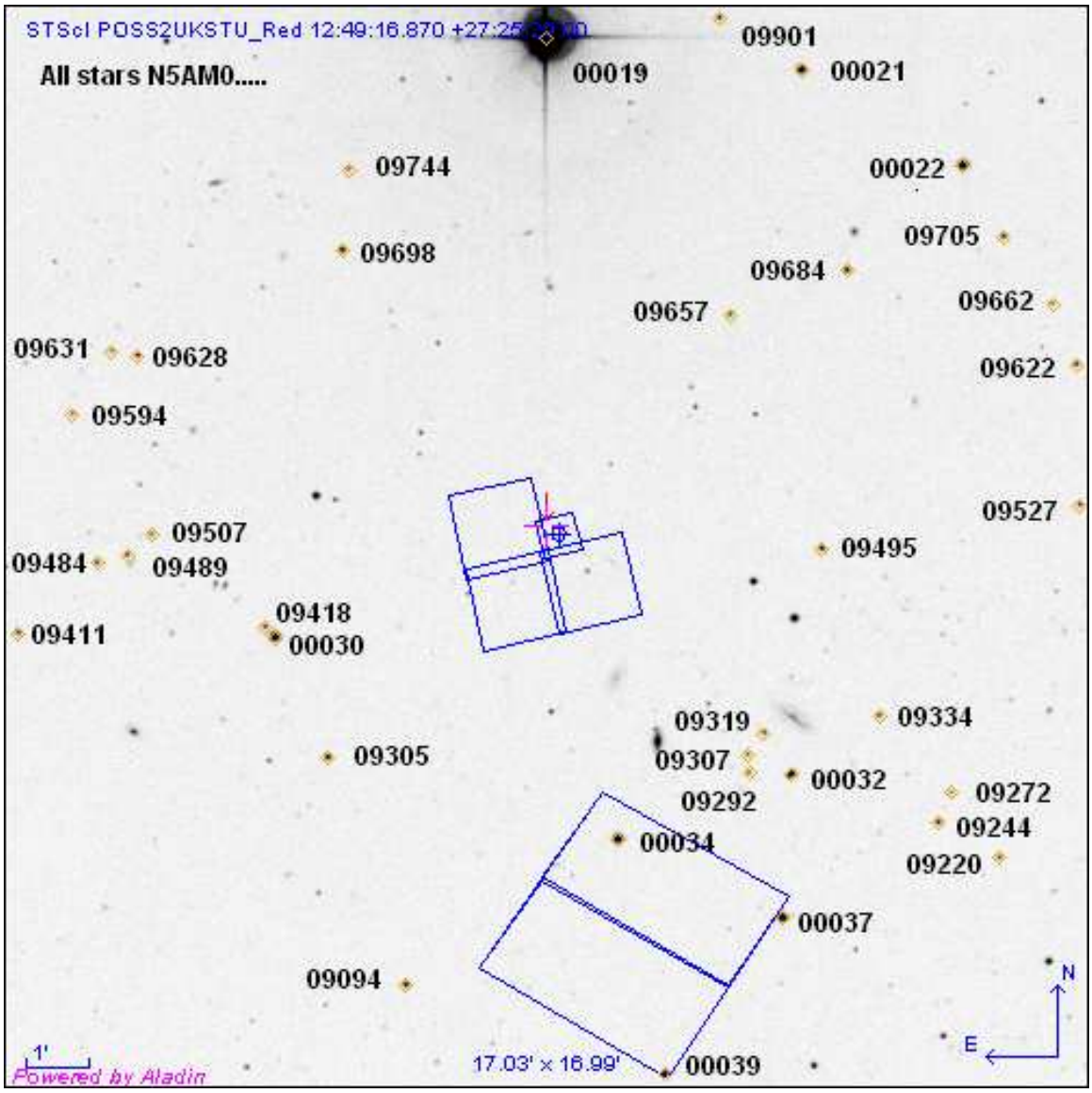
For this test, the standard exposure was modified making it be a coordinated parallel observation with a WPFC2 prime exposure. The test exposure was run through the new BOT/Aladin interface only; the old VTT/BOT did not take the position of the parallel aperture into account when performing its checking. The search radius used by BOT was 8.88'. The separation between the PC and WFC is 6.21', and after adding 2.83' for the

standard search radius, the approximate search radius BOT should have used is 9.04', very close to what was actually used. Given that the apertures are not aligned along the Search Radius Vector (described above), this small difference (especially given that BOT uses a larger radius) is not important.

A total of 923 stars were found in the new BOT, so the table below only lists the science concerns (35). The objects detected were:

GSC2 ID	RA (12)	Dec (+27)	F	J	V	B-V	Type
N5AM000019	49 17.4519	33 8.57	---	---	5.75	0.05	**O5V**
N5AM000021	48 59.3865	32 42.11	13.3	14.07	13.66	0.18	A5V
N5AM000022	48 47.8406	31 14.41	---	---	12.33	0.43	F0V
N5AM000030	49 35.9913	23 40.82	12.7	13.74	13.18	0.37	F0V
N5AM000032	48 59.3501	21 38.92	13.76	14.54	14.13	0.19	A5V
N5AM000034	49 11.5542	20 35.71	12.85	13.81	13.3	0.31	F0V
N5AM000037	48 59.8171	19 23.79	13.12	14.31	13.66	0.47	F5V
N5AM000039	49 7.9772	16 55.45	14.93	15.99	15.42	0.38	F0V
N5AM009094	49 26.3644	18 15.46	15.55	16.18	15.85	0.09	**O5V**
N5AM009220	48 44.5942	20 23.52	16.79	17.43	17.1	0.1	**O5V**
N5AM009244	48 48.9400	20 55.83	16.05	16.8	16.4	0.18	A5V
N5AM009272	48 48.0723	21 23.78	17.7	19.2	18.39	0.69	G5V
N5AM009292	49 2.3690	21 39.69	17.25	19.56	18.38	1.24	K4V
N5AM009305	49 32.1213	21 48.22	15.35	17.22	16.23	0.94	K0V
N5AM009307	49 2.4803	21 56.93	17.27	18.94	18.04	0.81	G5V
N5AM009319	49 1.3461	22 17.51	16.89	17.74	17.29	0.24	A5V
N5AM009334	48 53.2414	22 35.38	16.74	17.79	17.22	0.38	F0V
N5AM009411	49 54.1348	23 40.60	16.12	17.49	16.75	0.6	F5V
N5AM009418	49 36.6964	23 49.99	16.53	17.52	16.98	0.34	F0V
N5AM009484	49 48.6500	24 47.65	16.58	18.85	17.69	1.23	K4V
N5AM009489	49 46.5316	24 55.69	16.44	18.11	17.22	0.81	G5V
N5AM009495	48 57.4442	25 11.86	15.59	16.95	16.21	0.6	F5V
N5AM009507	49 44.8346	25 15.38	17.23	18.21	17.68	0.33	F0V
N5AM009527	48 39.2504	25 56.39	16.62	17.99	17.25	0.6	F5V
N5AM009594	49 50.5527	27 7.12	17.46	19.38	18.37	0.98	K0V
N5AM009622	48 39.6490	28 8.58	16.32	17.79	17	0.66	G5V
N5AM009628	49 46.0022	28 3.24	16.26	17.5	16.83	0.51	F5V
N5AM009631	49 47.8564	28 6.85	17.52	18.42	17.94	0.27	A5V
N5AM009657	49 4.1752	28 50.41	16.87	19.27	18.06	1.31	K4V
N5AM009662	48 41.4039	29 5.37	17.37	18.65	17.96	0.54	F5V
N5AM009684	48 55.9571	29 33.88	15.61	16.31	15.94	0.13	A1V
N5AM009698	49 31.6534	29 45.58	15.38	16.09	15.71	0.15	A5V
N5AM009705	48 44.9123	30 7.71	16.16	16.99	16.55	0.22	A5V
N5AM009744	49 31.3019	31 1.76	17.27	19.26	18.21	1.02	K0V
N5AM009901	49 5.2325	33 29.41	16.44	16.45	16.48	-0.34	**O5V**

The field map, showing the objects found, is given below.



Actual Duration

There are three ways in which the WFC can use actual durations – a CR-SPLIT exposure, a pattern exposure, and a number of iterations greater than 1 exposure. For this test, the second piece of a CR-SPLIT, the third piece of the pattern, and the third piece of a number of iterations=3 exposure will have the actual duration set to 100s, 200s, and 200s, respectively.

CR-SPLIT

An examination of the BOT details shows that the revised exposure time for the second piece of the CR-SPLIT was detected by the tool, and that value was used in the determination of the total counts from the stars; for the other pieces of the CR-SPLIT, the exposure time of 166.6s was used.

Pattern
An examination of the BOT details shows that the revised exposure time for the third piece of the pattern was detected by the tool, and that value was used in the determination of the total counts for the stars; for the other pieces of the pattern, the exposure time of 500s was used.

Number of iterations
An examination of the BOT details shows that the revised exposure time for the third piece of the pattern was detected by the tool, and that value was used in the determination of the total counts for the stars; for the other pieces of the number of iterations, the exposure time of 500s was used.

Issue
For CR-SPLIT and number of iterations, only the first sub-exposure is shown in Aladin. If there were different actual durations, both sub-exposures would need to be display, as they could have different answers. This is a problem is covered in APT-BOT OPR 56136, and *should be corrected prior to the release of the tool for WFC usage.*

Visualization - done

- There are many aspects to this test, all of which have already been verified by the previous SBC and HRC testing.

Issue
Aladin spreadsheet name link to an external html page with more details fails for the GSC2; this is covered with APT-VTT DR 1197.

Exception Handling

There are four types of exception handling to be tested; Network Query Error and Cancel Ongoing Operations have been verified in the SBC testing, and Bad Exposures has been verified in the HRC testing.

Unsupported Exposures

There are is 1 unsupported aperture (WFC2-2K) for the WFC, and 1 unsupported spectral element (CLEAR); when these are used, an appropriate error message is given.
There are 2 unsupported GAIN values (4 and 8).