CS Training
COS/STIS Instrument Team
Cycle 23

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With contributions from Dave, Nolan and Steve
Outline

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1. Introduction

1. Some Definitions

The Mission of STScI is to provide excellent support to HST science and to the user community
-> fundamental reason for the existence of the Institute and our scientific staff

A Contact Scientist (CS) is an Instrument Scientist (IS) belonging to the STScI team who supports calibration in general and use of specific instrument(s) for their assigned programs in particular.

The CS is one of the primary points of contact between STScI and the astronomical community
-> remain courteous and constructive in your interactions
I. **Introduction (cont.)**

The **CS Role** is to provide scientific & instrument expertise:

- On observing strategies (TA or SCIENCE) to meet the scientific objectives of the program
- To answer questions about instrument performance
- To maintain the *health and safety* of the COS and STIS/MAMA detectors

> Familiarity with COS & STIS IHB, latest STANs & training material is mandatory
> Complement the PC/helpdesk advice on technical issues

The **CS goal** is to do our best to ensure instrument safety, optimum effectiveness and data quality of HST observing programs.

⇒ Complete your CS reviews *before you get review requests when possible*

The **end of CS responsibility** occurs when programs have completed.

⇒ Subsequent questions should be redirected to helpdesk ([help@stsci.edu](mailto:help@stsci.edu))
⇒ Archival questions should be redirected to [archive@stsci.edu](mailto:archive@stsci.edu)
I. Introduction (cont.)

2. **Cycle 23 Timelines:*

   **Phase II Support**

   - **June 24, 2015:** TAC Notifications sent out to Proposers; CS/IS assignments, SPAR notification & phase I in early July

   - **July 23, 2015:** C23 Phase II submission deadline – Budget Hard deadline
     - Submitted phase II should be in final form (Targets, configurations, Texp, BT...)
     - Need strong justification for phase II submission delay
     - Delay accepted on a case-by-case basis only in consultation with PC

   - **Our response time** to inquiries should not exceed **a couple of days** unless additional expertise is needed to provide adequate answers
Post-Phase II Support

- **July 23, 2015**: Phase II deadline for all GOs and SNAPs, not PPARs
- **August 14, 2015**: PCs initial ingest and verification of proposals finished
- **September 7, 2015**: Initial Cycle 23 LRP released
- **September 18, 2015**: Pure Parallel (PPAR) proposal deadline
- **September 25, 2015**: Second release of Cycle 23 LRP with PPARs
- **September 30, 2015**: Majority of CS/IS reviews should be completed...
  -> *Start CS reviews early* for available proposals
  -> *CS reviews should be completed* as permitted in light of team priorities and GO issues but *no later than Dec 31st, 2015* for programs with no scheduling requirements
II. Phase II Support Activities

1. Responsibilities: PI, PC, CS, User Support Leads

PI Responsibilities:
• Deliver an error-free Phase II proposal
• Check target coordinates and proper motion accuracy
• Check exposure times and S/N needs
• Produce and check confirmation charts
• Perform BOT reviews & provide supporting material to CS upon submission
  => Provide ETC ID numbers in APT for both ACQ & Science exposures

PC Responsibilities:
• Help PI deliver error-free APT phase II & check submitted phase II
• Check for duplications & phase I/Phase II compliance
• Answer APT questions (along with helpdesk)
• Can accept minor changes (Texp & target coordinate updates)
• Should forward configuration/target change requests to si_csreview lists; User Support Leads review requests
II. Phase II Support Activities (cont.)

User Support Block Responsibilities:

- Verify & Update CS list yearly (Lead)
- Provide internal CS training (Lead)
- Obtain & Distribute TAC-approved COS/STIS Phase I files (Lead & RIA Support)
- Assign CS/IS to programs & ingest assignments in SPAR (Deputy & Team Lead)
- Verify duplication issues (Deputy)
- Verify and approve (or not) minor program change requests (Deputy)
- Verify and approve (or not) AVAILABLE MODE requests (Lead)
- provide input to TTRB if change request is major (Lead & Deputy)
- Oversee out-sourcing effort, if relevant (Lead)
- Resolve issues between PI/PC/CS, when necessary (Lead)
- Oversee overall CS completion rate (Lead & RIA Support)
- Forward weekly CS review due dates to relevant CS (Deputy)
II. Phase II Support Activities (cont.)

CS/IS Responsibilities:

Proposal Handling:

• Get familiar with Phase I of your assigned programs
• Protect your phase I repository: proposals are confidential
  -> remove files from your mailbox, don’t leave them on your desk or share them, etc..

Communication Procedures:

• CS communicate directly with PI/PC, IS are anonymous and send technical advice to PC/helpdesk (unless chosen otherwise)
• Copy all communications to the program repository: hstXXXXX@stsci.edu
• Keep all exchanges in writing if at all possible to retain details of exchange
II. Phase II Support Activities (cont.)

Communication Procedures (cont):

• If phone exchange is necessary:
  - send email to the PI summarizing decisions made & copy repository
  - ask PI for email confirmation of agreement

• If CS needs to consult another expert in team, CS remains the prime point of contact and communicates information

• If contacted for a proposal you are not CS for (colleague of yours, conference, etc), inform official CS, forward questions to CS and copy repository

• When out of office:
  - secure a CS back-up in the team
  - inform Team Lead & User Support Block
  - set-up automatic email with back-up info so PC/PI know whom to contact
II. Phase II Support Activities (cont.)

Communication Procedures (cont):

How to access the Public Folders hstxxxxx@stsci.edu

- log in to your outlook web application at: https://mail.stsci.edu/owa/
- at bottom left click: “Public Folders” icon

  - Click STSCI
  - Click HST Observing Program Email
  - select your program ID
II. Phase II Support Activities (cont.)

2. Instrument Support

*The advice we give is only as good as the information we receive!*

- Ask the PIs for details about sources, fields, crowding, science goals
  - Important to determine feasibility and best TA strategy
  - Feasibility concerns should be sent to User Support Lead for internal discussion

- Be aware of latest calibration changes prior to phase II support period:
  - Check most recent versions of IHB, STAN, CS training highlights

- Install newest version of APT for compatibility with Users
II. Phase II Support Activities (cont.)

2. Instrument Support (cont):

- **Forward all requests** for AVAILABLE MODE, configuration Change and Duplication checks **to USER SUPPORT Leads** for approval (Paule & Nolan)

Before phase II deadline, PI has to provide CS with:

- -> **exact** configurations changes
- -> strong scientific justifications
- -> explanation for potential duplication & safety issues

- **Enforce FP-POS Policy**: Section 4.4 of Primer: “Optimizing the Science return from COS”
  - -> If justification is not in phase I, we won’t allow reduction in FP-POS usage unless science justification is really strong
  - -> Forward offending cases to User Support Leads
II. Phase II Support Activities (cont.)

2. Instrument Support (cont):

*BOT is only used to clear field stars. The ETC has to be used for science targets and any unknown or unsafe field star!*

**PIs need to:**

- Run the BOT for all TA + SCIENCE configurations
  
  -> they need to check the BOT results! Null result does not mean SAFE...

- Enter ETC IDs in APT form
  
  -> The “warning” should not be ignored; reviews can be expedited on our end and inconsistencies can be found

- Provide all BOT information if field star is flagged as “unknown” or “unsafe when submitting their phase II

- Identify remaining BOT issues *at the time of phase II submission*
II. Phase II Support Activities (cont.)

2. Instrument Support (cont):

CS/IS do...

• ...not Check scientific content of proposal (PI)
• ...not Modify or resubmit phase II entries for PI:
  -> We do not have that authority but PCs can (after agreement)
  -> We can manipulate phase IIs, save to disk but never resubmit
• ...not Verify target coordinates and confirmation charts (PI)
• ...not Answer observing & scheduling questions (PC)
• ...not Answer archive questions (archive@stsci.edu)
• ...not Answer data analysis questions after program completion (help@stsci.edu)
III. **Cycle 23 Highlights**

- **COS Operations & LP move Reminders**
  
  -> COS/NUV operations remained unchanged since SM4
  
  -> COS/FUV operations with Blue Modes G130M/1096 & 1055 remain at LP2
  
  -> COS/FUV operations with all configurations other than G130M/1055-1096 moved to LP3 on Feb 2015

  At LP3, extraction of COS/FUV observations is using new 2-zone algorithm
  
  -> calibration of COS/FUV/PSA observations for *point sources* is optimized
  
  -> calibration of COS/FUV/BOA observations or COS/FUV/PSA observations for *extended sources* are not optimized (STAN March 2015 for details)

  => Need to flag targets as Point or extended sources starting in Cycle 23 both in archive and for calibration purposes
⇒ New COS Target-level EXTENDED keyword in APT 23.2 (released June 23rd, 2015)

At the Target Description Level, PI of COS observations have to define their sources as EXTENDED="YES" or "NO"

- EXTENDED="YES" if FWHM >0.6 arcsec or R > 0.35 arcsec
- EXTENDED="NO" for sources of smaller extent

At the exposure level, the old EXTENDED keyword is still present in the “optional Parameters” menu but is obsolete

- Selecting a value for the exposure level EXTENDED keyword will only trigger a warning message; it bears no effect on the data themselves
III. Cycle 23 Highlights (cont.)

• **COS: LP2 Blue modes & Segment=B**

With G130M/1055/1096 & SEGMENT=B selected, TAGFLASH is disabled: the lamp does not provide counts below 1180Å

⇒ Users **NEED to include GO wavecals** in specific sequences depending on the number of orbits per visit and FP-POS usage

⇒ See June STAN 2013 & Steve Penton’s web link for strategies:


⇒ APT will issue a **warning for PIs using these configurations** asking them to contact their CS for further advice.

*NB: The APT warning will remain after the wavecal have been inserted but the phase II can be submitted with the warning*

⇒ **SPAR flags visits with these configurations** and reminds CS to check appropriate wavecal inclusions
III. Cycle 23 Highlights (cont.)

- **COS: Blue modes usage & Segment=BOTH (LP2 & LP3)**

  Programs with G130M/1055/1096/1222 observations where segment A is left "ON" for during exposures with significant count rates should be checked to verify that charge is not unnecessarily extracted on SEGMENT A.

  -> If you are the CS on one such proposal; bring the program to the attention of User Support Block for internal review.

- **COS Exposure times with FP-POS = ALL**

  Starting in Cycle 20, when FP-POS=ALL is selected the exposure time entered in APT is that for EACH individual FP-POS; APT no longer divides the exposure into 4 equal sub-exposures (prior to Cycle 20).

  -> beware of Orbit Planner Adjustments: check that exposure time entered in APT/Phase II is consistent with scientific goals (e.g. for high S/N, need to have approximately equal Texp for each FP-POS)
III. Cycle 23 Highlights (cont.)

• COS: FP-POS usage with regular modes

The use of **multiple FP-POS positions for each CENWAVE setting of the COS FUV/ G160M, FUV/G130M & FUV/G140L(1280) is required.** A strong scientific justification to do otherwise needs to be provided in the Phase I.

--> APT issues a warning if all FP-POS are not used in a visit for regular modes

--> Warning cannot be ignored...

**Rationale:**

--> reduces impact of Lyman A Geocoronal lines on detector for COS longevity

--> Improves S/N and Legacy value of archive

Some flexibility is granted by User Support block on case-by-case basis ONLY
III. Cycle 23 Highlights (cont.)

• **COS/NUV Dispersed light TA with M gratings**

  Due to the increased background level and the OSM drift (that moves important lines off the detector) some grating/cenwave combinations might cause the TA to fail. Below is the list of approved combinations:

  • G185M: 1786, 1913, 1921
  • G285M: 2637, 2657, 2676, 2695
  • G225M: 2306, 2357
  • G230L: All

  Please check for those when reviewing your COS programs.
III. Cycle 23 Highlights (cont.)

- **COS TA Parameters: Recommended values** (Table 8.3 IHB)
  - **ACQ/SEARCH:**
    - STEP-SIZE should be 1.767” (ok to be smaller, but not larger)
    - SCAN-SIZE is usually 2 or 3-- 3 is recommended (but takes > 2x as long)
    - CENTER should be FLUX-WT for SCAN-SIZE=2 and FLUX-WT-FLR for SCAN-SIZE=3
    - S/N should be > 30 in brightest dwell point- recommended is 40
  
  - **ACQ/IMAGE:**
    - Exposure Time should generally be < 300 seconds.
    - BOAs need S/N=60, PSAs should have S/N=40 (1600 counts)
    - BOA S/N=50 and PSA S/N=30 are ok in a pinch, IF the target flux is well known.
  
  - **ACQ/PEAKXD:**
    - No parameters to specify
    - S/N =40 for NUV; S/N> 25 on Seg A for FUV
  
  - **ACQ/PEAKD:**
    - IF NUM-POS = 3 then STEP-SIZE should be ~1.3”, CENTER should be FLUX-WT
    - IF NUM-POS = 5 then STEP-SIZE should be ~0.9”, CENTER should be FLUX-WT-FLR (better centering than NP=3)
    - NUM-POS = 7 or 9 are usually not used. They can produce better centering, but take longer. STEP-SIZE should be ~0.5” for NP=7, and ~0.4” for NP=9.
    - S/N = 40 in brightest dwell point
III. Cycle 23 Highlights (cont.)

- **STIS/CCD observations: not subject to BOP reviews**

**IS should Check:**

- if ACQ is present (and unsaturated if possible)
- if ACQ/PEAK is present for slits sizes less than 0.2”
- If binning is default & CR-SPLIT is present
- if flat-field observations are included for G750 observations

- **The STIS 31x0.05” NDA/NDB/NDC slits are SUPPORTED**
  
  - provide intermediate attenuation
  - provide comparable resolution to the 0.2x0.05 ND slit

⇒ Alternative configuration to small slits for bright targets
III. Cycle 23 Highlights (cont.)

• STIS/CCD observations of faint sources: The E1 Position

Use of E1 position is strongly recommended to mitigate the decrease in CTE for targets with source count rates less than 50 e-/pix or extended sources (diameter > 5 arcsec).

⇒ contact PI if targets are faint or extended and central position is used in their phase II (see IHB Section 4.2.3 for more info)

N.B: For bright targets requiring high S/N, the central position on the detector should be still be the recommended one.
IV. CS Reviews: Check List

BOP Common to COS and STIS

1- Make sure to review the instrument parameters in the Phase II proposal, which goes to the telescope and not those in proposal free text (APT “exposure Name” or emails) that may be wrong.

2- Answer all questions in the BOP review section of SPAR. Multiple targets/visits may be included in the same template, but each must be addressed separately. You may paste detailed flux or calculation inputs from the proposal or GO email BUT you must do your own ETC calculations for all targets and all unsafe/unknown field objects. Report your results in SPAR as well.

3- For multiple targets with same configuration, look for the worst cases (brightest + bluest) to logically clear others with one ETC calculation. Note that the field must be cleared for each target though.
IV. CS Reviews: Check List (cont.)

BOP Common to COS and STIS

4- Recheck FUV and NUV fields for SCIENCE exposures against screening limits using APT/BOT/Aladin interface.

-> For COS: global rates refer to the entire detector (segment/stripe).

-> For STIS/MAMA: local rate check bins data to 8x8 pix.

Multiple objects in this area will be checked as single.

5- Check GO-supplied target parameters as thoroughly as permitted, most critically if count rate is within factor 2 of our screening limits. If the object parameters are judged to be uncertain, or you have any other doubts, consult with the User Support Lead.

There are no longer Automatic secondary BOP review.

6- Any unresolved issue at time of Phase II submission must be documented by GOs. GOs must provide whatever data and format we request to resolve issues.
IV. CS Reviews: Check List (cont.)

BOP Common to COS and STIS

7- IUE data must be low-resolution large aperture. Annotated images must be accompanied with corresponding photometric tables (HST, IUE, 2MASS, etc...)

8- ETC Spectral Energy Distributions TIPS: Use original Kurucz models for BOT earlier than Sun (earliest O5) not Castelli & Kurucz, not Bruzual. Use solar template for normal G2 but need actual data for later types in FUV because no models include chromospheric emission lines.

9- Stars with only V magnitude must be treated as unreddened O5 stars. Adding a single color they may be treated as reddened O5’s. With 2 colors SpT and reddening can be determined. A reddened O5 has more UV flux than an unreddened star of the same color. Do not use BOT values which are approximate. Check against our screening limits.
IV. CS Reviews: Check List (cont.)

BOP Common to COS and STIS

10- POS TARG, patterns, Target-Offset, Mosaics increase the macro-aperture to screen. ORIENTS reduced the area of concern. Note that the aperture orientation is updated to the scheduled value in APT/Aladin

11- Moving target fields must be cleared when windows are determined. Targets of opportunity when activated:
-> very rapid turnaround (less than 24h) is disallowed for BOP detectors

12- Coordinated parallels should have unique ORIENT. The specified parallel field is now properly screened and displayed by APT/BOT. Parallel STIS/MAMA imaging & prism and all SBC are now excluded.
IV. CS Reviews: Check List (cont.)

BOP Common to COS and STIS

13- Proper motion to the midpoint of the cycle is now implemented (Cy19) as a selectable option in APT/BOT. There are 3 epochs involved, the correct field will be screened by BOT but the target location relative to the field will be incorrect.


-> POS TARG is *disabled* when proper motion is activated.

14- For procedures and requirements for observations of unpredictably variable objects such as CVs, see ACS ISR 2006-04 & COS TIR 2015-01. Such targets require real time confirmation of quiescence within 24h before BOP observations either ground or onboard.
BOP Common to COS and STIS

15- Single GS also increases the macro-aperture but won’t usually become known until scheduling, so require further review later. The COS 7” or STIS 5” buffers must be increased to 50” in this case. (STIS ISR 2000-1).

Review procedure is: create a LINE pattern with 5 points and spacing of 10” at 0 deg orientation in the POS TARG coordinate frame. Make the exposure in question use that pattern and run BOT. As always be sure NOT to save or resubmit any proposal changes. Single GS is disallowed for SNAPS. NB: GS re-aqs should be included if visit is longer than 2 orbits with small STIS slits to avoid target drifting out of aperture.

16- If GO wishes to change specifications after the STScI BOP reviews are complete, they must submit a scientific justification and new BOP reviews to User Support Block Lead for approval.
IV. CS Reviews: Check List (cont.)

BOP: COS specific

1- All ACQ exposures must be screened. Be careful to determine which configuration produces the largest field.

2- Nominal macro-aperture is 43” diameter circle, including both the PSA and BOA (13.2” apart) with 7” buffers, but more critical area depends on which aperture is active. BOT calculates corresponding throughput for each aperture and reports objects in overlap region twice.

3- PSA buffer increases to 15” for very bright field objects that would produce: global rates greater than $1 \times 10^5 \text{ cts/s/segment in FUV}$, $2 \times 10^5 \text{ cts/s/stripe in NUV}$ local rates greater than $3.3 \text{ cts/s/pix in FUV}$ and $250 \text{ cts/s/pix in NUV}$. Not implemented in BOT, but should be rare.

4- Screening limits are in COS IHB Table 10.1. Note that local count rate limit do not apply to G130M/1055 and 1096 (local limit is 0.2 count/s/pixel for predictable and irregular sources)
IV. CS Reviews: Check List (cont.)

BOP: STIS specific

1- ACQ use CCD and are not subject to BOP Review: check for saturation if possible

2- STIS macro-apertures vary widely from small echelle slits to direct imaging and slitless spectroscopy. BOT checks the field to appropriate radius from target configuration and adds 5” buffer. All apertures are correctly displayed and screened by BOT.

3- The buffer increases to 13.5” for very bright field objects that would produce:
   global rate greater than $1.5 \times 10^6$ cts/s
   local rate greater than 500 cts/s/pix
   *Not* implemented in BOT, but should be rare.

4- NDQ filters have special problems described in Section 5.4 of IHB

5- Screening limits are in Sections 7.7 and 13.8 of IHB
IV. CS Reviews: Check List (cont.)

BOP: Alternatives for uncertain/bright Targets

1- Change/Add aperture, filter, grating, wavelength, setting, detector. Duplication check is required (PC). Configuration changes may be approved by the User Support Lead if no duplications but Science instrument changes require TTRB approval. *CS never alters the Phase II proposal: we make recommendations to PI only!*

2- Add POS-TARG and ORIENTS to avoid uncertain fields. Any unsafe or questionable target must be at least 7” (COS) or 5” (STIS) away from detector edge at all allowed rolls. Beware of POS-TARG back toward STIS/FUV-MAMA repeller wire or too close to detector edge.

3- Change target if needed. Refer to Lead for approval or TTRB referral if scientific objectives may be altered. Duplication checks need be done by PC again.

4- Take preliminary observations with safe configuration. Must come out of allocated time unless TTRB grants time increase (unlikely if not requested in phase I)
V. Final Remarks

Programmatics:

1- The program review status is maintained on our COS/STIS User Support Page

2- Lists of Urgent/verified proposals are distributed via emails under the “Weekly Report” banner and are circulated by User Support Block weekly. Please abide by the “Review before” date. If delays occur, inform Lead & Deputy of underlying reasons

3- Track your review time: update to nearest hour each time a proposal is worked on and send final results to CS Lead. Do this continuously as reviews progress

4- Transmit to User Support Leads notable cases of errors (corrected or not) and recommended improvements. These may be useful to other CS/IS
V. Final Remarks (cont.)

- APT/BOP Reviews are to be done expeditiously but not hastily
  - CS is sole judge of safety
  - All doubts are to be cleared before program can execute.
  - All additional BOP information has to be provided by GOs.

- Moving target (MT) and Target of Opportunity (ToOs) programs cannot be completed until activated
  - Instrument specifications should be checked early to catch any issues.

- Work With GOs & PCs cooperatively on solutions and alternatives, but do not accept pressure!
V. Final Remarks (cont.)

Health and Safety rule!

Happy CS Review Season 2015-2016!
Additional Resources
CS Reviews: Tools

Major Resources:

1- The SPAR Engine: we record and submit our CS reviews with this system

2- BOT/Aladin interfaces: called from HST Astronomers’ Proposal Tool (APT)
   Current Version: 23.2.1 -> update if needed!

3- Galex/GSC2/MCPS databases: to check field stars coverage: Need to be used if the BOT/Galex tool generates a warning about field empty or crowded
   http://galex.stsci.edu/GalexView/
   http://ngala.as.arizona.edu/dennis/mcsurvey.html (MC survey)

4- ETC to verify health and safety of science targets and unknown & unsafe field targets
CS Reviews: Tools (cont.)

1- SPAR v1.30 tool is available: https://spar.stsci.edu
- Replaced the CS Toolbox since April 17th, 2012

- How to use it:

  a- login: your email address & AD Password
  b- Review template flags & check lists.
  c- SAVE template OFTEN (it is not automatic!)
  d- SPAR sends submitted review copies to all parties involved in review (CS + outsourced or backup is identified in contacts list)
  e- Combined COS+STIS proposals require separate COS and STIS templates; Do immediate reviews of MT and ToOs, insofar as possible.
  f- COS Buffer time flag has been removed (BT> exposure time is obsolete now)
CS Reviews: Tools (cont.)

2- APT/BOT/Aladin Interface:
1- Upload the proposal to review in APT (retrieve from STScI)
2- Select single visit or single exposure to be reviewed
3- click “BOT icon” on top menu bar in APT
4- Select GSC2, click “Update display” and check all results in the summary table
5- Select Galex, click “Update display” and check all results in the summary table.
When relevant, activate “Proper Motion” feature and Repeat steps 4- and 5-
6- “LOAD DSS”. The exposure(s) will appear as different planes in the order they are listed in the APT spreadsheet. Multiple Galex surveys are now accessible in Aladin (see demo)!
7- Macro-apertures and stars are displayed when selecting exposure planes
8- A region selection allows display of details for enclosed star(s) in table at bottom of Aladin window
9- “Orient Ranges” in APT top menu allow display of specifications and U3 arrow. Grab arrow or corner to rotate. “Reset Orients” returns to original settings.
Reviews: Tools (cont)

3- Galex/GSC2 databases

- BOT screens all fields with Galex AIS (all-sky) survey coverage.
- BOT assumes all Galex sources are unreddened O5V stars.
- If targets do not violate local/global count rates they are declared “safe”
- BOT does not check for Galex coverage of the field to be cleared!!
- Need to check for coverage separately (using Galexview/Aladin, for instance).
- If no Galex coverage, no sources will be returned in summary table. Note that the result is the same when there are no sources but field is covered!
- Galex provides an upper limit to individual source flux because of low spatial resolution (4”). If it clears, fine. If not, the source(s) may still be safe but required higher resolution data. HST images can be loaded in Aladin. No calculations will be done but blended sources can be resolved.
- Magnitudes between FUV=14.332-12.6 and NUV=14.875-10.2 are subject to saturation. Non-linearity corrections are now applied by the BOT. Targets brighter than those limits are not to be cleared with Galex.
3- GSC2 database:
- Contains 2 filters F and J to derive 1 color to 21-22 mag over full sky.
- BOT calculates V and B-V from J and F under conservative assumptions (all main sequence stars with no reddening). Since one color does not determine SpT and E_B-V, all stars with B-V <+0.1 are treated/classified as O5V stars. All stars bluer than a given magnitude (spectral element dependent) are assumed O5V

Beware:
- One or both filters have significantly brighter limits on some fields (Galactic Center and Magellanic Clouds)
- Resolution is inadequate in some fields; young regions in nearby Galaxy, extended regions. As a result, “unknown” and “unsafe” objects will require attention
- GSC2 omits stars within a substantial radius of very bright stars because of PSF artifacts. Star within saturated bright stellar or nebular images may be absent, requiring alternative sources
GSC2 database (continued):

- BOT now clears faint stars assuming they are unreddened O5V stars if only 1 filter is present as follows.

<table>
<thead>
<tr>
<th>Detector</th>
<th>no F and no J</th>
<th>F and no J</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS/FUV</td>
<td>list F, J, V, B-V, and reason as &quot;unknown&quot;, spectral type as &quot;no color info&quot;</td>
<td>For objects with no J, assume the object is an O5V star (J-F=-0.42) and process normally. If the object does not trigger any alerts, list the F, V, spectral type (assumed O5V), count rates, and status. If the object does trigger an alert, list the F, spectral type as “no color info”, and reason as “unknown”.</td>
</tr>
<tr>
<td>COS/NUV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Documentation Resources

1- Cycle 23 Phase II instructions- P2PI.pdf:
http://www.stsci.edu/hst/proposing/docs/p2pi.html

2- COS and STIS STANS for latest technical updates:
http://www.stsci.edu/hst/cos/documents/newsletters/

3- Instrument Handbooks:

4- APT/BOT demos and movies.
APT general page: http://www.stsci.edu/hst/proposing/apt/using_apt

5- User Support pages.
INS: http://www.stsci.edu/institute/org/ins/usersupport
6- APT/Aladin & Phase II Interface demos and movies:
http://apst.stsci.edu/apt/external/help/roadmap2.html
http://apst.stsci.edu/apt/external/help/documentation/Aladin-PII.html
http://apst.stsci.edu/apt/external/help/documentation/Aladin-PosTarg.html
http://apst.stsci.edu/apt/external/help/documentation/Aladin-Pabern.html

7- GSC V2.3 is used.
http://gsss.stsci.edu/Catalogs/GSC/GSC2/GSCIIProperties.htm
A few facts (see Lasker et al. 2008):
Astrometry: Complete to V=19.5 mag, F=20.5 and J=21.5; Ref frame ICRF; typical error: 0.3" (worst case is 0.35-0.75" at edges of plates). Photometry: Errors 0.2-0.25 mag. For stars brighter than V=9 mag in GSCII, Tycho-2 mag is used.
8- Galex: to check field coverage and crowding:


Internal resource: APT/BOT/GALEX tool:

Select this option

Click here to bring up popup