HERSCHEL SPACE OBSERVATORY

Herschel Observation Planning Tool (HSpot) Changes in HSpot 5.3

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Chapter 1. Introduction

HSpot is a complex and evolving system to which improvements are being made through a series of planned new releases at key dates in the Herschel schedule. Many of these changes are essentially invisible to the vast majority of users (additional specialist functionality used only by the HSC or the expert users at the ICCs, cosmetic improvements, changes to the Spot core, improved characterisation of instruments, bug fixes, proposal handling changes, etc.), some though may have a significant impact on all users, particularly those related to time estimation.

The purpose of this document is to give a guide to the main changes that have been made in the Astronomical Observing Templates (AOTs) for each instrument since the release of the final user version for the 2010 Call for Proposals was made (HSpot v5.0). HSpot users who have prepared previously observations with HSpot should be aware that there are numerous changes that will affect already prepared Astronomical Observation Requests (AORs); these are detailed in this document. Time estimates that were previously prepared with HSpot v5.0 may be out of date and must always be re-calculated, although the differences are usually small. Even when time estimates do not change, there are important underlying differences in the software that make a real difference to how the observations are executed on board, so even apparently neutral time estimator changes may be very important for your data. Since launch there have been regular changes in the software that controls the AOTs, with frequent changes of software version (Mission Configuration); each Mission Configuration links to a new time estimator version; while time estimation is now more stable as better knowledge of the instruments is available, there is a constant tweaking of the way that observations are taken to optimise data quality.

Users are strongly recommended to read this document in conjunction with the relevant Observers' Manuals and the HSpot Users' Guide.

1.1. A note on changes made between HSpot v5.2 and v5.3

HSpot 5.3 is our routine operations version of HSpot for the GT2 Call for Proposals. A further slough of changes have been made to HSpot relative to the final OT1 Call version (5.2.3) to take into account the frequently major changes in the way that observations are carried out in flight compared to the pre-launch version. Science Demonstration Phase and early Routine Operations showed that some observing modes needed to be radically re-designed to optimise them and also showed the need for new, second-generation observing modes in some cases. At the same time, updates have been made in the Spot Core that have been incorporated in these releases. There have been several intermediate releases that astronomers did not see; often these patch specific functionality needed by the instruments in their Expert User mode that may have no impact on the astronomer save to give him a better understood and calibrated instrument and to allow the HSC to test changes in the code thoroughly before the are released to users. Many of the changes in these intermediate versions affect only the software specific to the HSC and ICCs such as the Mission Planning System, or the proposal processing, which the proposer will never see.

The 5.3.1 version of HSpot, like previous updates for astronomers, involves many changes. No less than 27 problems are fixed, or updates applied by HSpot 5.3.1 relative HSpot 5.2.3, so this is actually a bigger revision than our previous upgrade to astronomer HSpot. Most were fairly small changes were required to bring HSpot in-line with in-flight reality, as the modification, or deprecation, or inclusion of observing modes requires other, related changes in HSpot. Some of the changes have been relatively complex to implement and have required interation over intermediate versions to ensure that they are correct.

No attempt is made to describe every single HSpot change. Here we describe only the changes that will have a significant effect on the way HSpot works or that will be obvious to the user.

Since the 5.2.3 release, much work has been put into fine-tuning and to activating second-generation observing modes that are required for the GT2 and, later, the OT2 Call.

For each change, the problem or change request number is given (prefixed by "PHS-SxR" to say

that it was raised on the Proposal Handling System), the title of the Bug Report or Software Change Request and brief details of its resolution and effects on HSpot.

Chapter 2. General HSpot updates:

This section describes the main updates to HSpot, relevant to all users, which have been made since the release of the final version version for Phase 2 of the Open Time Call (OT1) was made (HSpot v5.2.3). Users are strongly recommended to read this document in conjunction with the HSpot Users' Guide.

2.1. General changes

2.1.1. A note on the upgrade to HSpot 5.3.1

HSpot 5.3.x represents mainly incremental changes over HSpot 5.2.3. The biggest change from a user's point of view is support for additional second generation observing modes and some fine-tuning of these modes and well as a major update of associated documentation.

2.1.2. Main changes

- [PHS-1350] HSpot should report the star tracker Solar Aspect Angle for the target to the user.

  - Implication for user: Given that the schedulability of AORs is limited at Solar Aspect Angles (SAA) smaller than -20 degrees (i.e. solar elongation greater than 110 degrees) and extremely limited at SAA smaller than -22 degrees, this is important information for the user on AOR visibility.

- [PHS-1157] Visibility calculations of HSpot and MPS differ by up to four days.

  - Implication for user: To speed up visibility calculation in HSpot some approximations are made. This though can lead to important differences in the nominal visibility of an AOR reported by HSpot and the real one, as reported by the Mission Planning Software, particularly close to the cusp of permanent visibility. This can lead to users believing that a target is visible when it is not, with important implications for scheduling. Some changes have been made in the algorithms to ensure that the agreement between HSpot and MPS is valid for a wide range of ecliptic latitude.

- [PHS-1573] Overheads are wrongly calculated when there are several constraints at the same time.

  - Implication for user: An important bug in overhead calculation was noticed when an observing programme has complicated constraints involving concatenations and timing constrints simultaneously. On some occasions a time constraint overhead was being charged more than once on a single concatenation. It is believed that this only affected a very small number of OT1 proposals, for which the time saving after the fix was made has been significant.

- * [PHS-1619] Update on-line Help for HSpot 5.3
  - Implication for user: Substantial updates have been made in the On-line help to synchronise it with HSpot and to update information.

- [PHS-1593] Change the constraint column convention in PHS.

  - Implication for user: Additional constraint columns have been added to HSpot so that different types of constraint can be identified easily by users and HSC personnel without having to open the constraint editor and examine the AORs one by one. HSpot now identifies observations that are Sequenced (S) and Grouped within a particular time interval (G).

  This fix is also related to the following two bug reports:

  [PHS-1457] AOR overlay fails towards the poles.

- Implication for user: The AOR overlay routine was not using spherical geometry to plot overlays. This meant that, close to the celestial poles, the AOR overlay was giving a totally inaccurate representation of the AOR with respected to the requested position.

[PHS-44] Inconsistent visibility for PACS scan maps

* [PHS-1541] AOR overlay is incorrect for some mini-scan mode AORs

2.1.3. Other changes

- [PHS-1454] HSpot suddenly no longer finds the ephemeris for Pluto.

  - Implication for user: There was a bug in the handling of ephemeris files for SSOs that meant that for dates beyond the likely end of helium, an overlay could be requested beyond the end of validity of the ephemeris, giving a misleading error that the ephemeris was not available in HSpot.

- [PHS-141] HCSSv0.SCI.2AT: Re-wording of "Retrieve latest proposal from HSC"

  - Implication for user: Small update in an HSpot message.

- [PHS-163] Changes to 'Proposal Submit' window in HSpot.

  - Implication for user: A minor change to a misleading message.

- [PHS-1606] Title of HSpot 5.3.x main window and Proposal Submission Tool window should refer to "GT2 Call Phase 1 Version".

  - Implication for user: Updates the proposal submission window for the new Call.

- [PHS-1631] Please update "Tip of the Day".

  - Implication for user: Small change to correct ambiguous information in one tip.

- [PHS-1500] co-users of submitted proposals should also be allowed to retrieve the proposal documentation.

  - Implication for user: Allows a co-I flexibility to act on behalf of a PI and to see a complete proposal.

- [PHS-149] Insertion of PI details in proposal cover sheet from HSpot.

  - Implication for user: Mainly an administrative fix for the HSC, allowing the PI's name to be included as a co-I of a proposal.

Chapter 3. PACS-related HSpot updates:

This section describes the main updates to HSpot that are relevant to PACS users that have been made since the release of the updated version for the OT1 Call was made was made (HSpot v5.1). PACS users are strongly recommended to read this document in conjunction with the PACS Observers' Manual and the HSpot Users' Guide.

3.1. Most recent changes

- [PHS-1587] Concatenation validator should accept targets within 2 degrees slew radius.

  Effect: Users can specify an OFF position for unchopped spectroscopy that is up to 2 degrees away from the target position. This is the only exception permitted to the rule that concatenation can only be carried out within 1 degree of a target.

- [PHS-1604] Pacs Line Spectroscopy AOT: bright line option for unchopped grating scan mode.

  Effect: This is the implementation of a second generation observing mode for unchopped range spectroscopy targets that have high expected line fluxes above the saturation level of the default capacitance.

- [PHS-1597] Uplink ON/OFF marker for Unchopped Range Spectroscopy on the HSpot front-end.

  Effect: This allows users to link AORs for processing in HIPE, which is important for reduction of unchopped photometry.

Chapter 4. SPIRE-related HSpot updates:

This section describes the main updates to HSpot, relevant to SPIRE users, which have been made since the release of the updated version updated version for the OT1 Call was made was made (HSpot v5.2.3). SPIRE users are strongly recommended to read this document in conjunction with the SPIRE Observers' Manual and the HSpot Users' Guide.

4.1. Most recent changes

- There are no significant changes in HSpot 5.3.1 relative to HSpot 5.2.3.

Chapter 5. HIFI-related HSpot updates:

This section describes the main updates to HSpot that have been made, which are relevant to HIFI users, implemented since the release of the updated version for the OT1 Call was made (HSpot v5.1). HIFI users are strongly recommended to read this document in conjunction with the HIFI Observers' Manual and the HSpot Users' Guide.

5.1. Most recent changes

- [PHS-1512] Default HSpot line tables contain many incorrect LSR frequencies/wavelengths.

  Effect: The patching of this bug has obvious benefits to anyone using the default line lists.

- [PHS-1549] Wrong band edges in band 1a when default GUI open in HIFI point or mapping AOTs.

  Effect: There was a problem when using the default settings without editing them.

- [PHS-1528] Remove pop up window asking whether LO frequency should be changed or not.

  Effect: The redshift correction is now applied automatically to ensure correct centring and thus to stop lines falling out of the window when an LO change is made.

- [PHS-1534] Re-enable HIFI DBS-X mode.

  Effect: This mode was temporarily disabled while it was undergoing an extensive re-design. It is now available again.

- [PHS-1524] Target LSR vs SSB velocity not correctly taken into account in some cases.

  Effect: In some cases the reshift needed to correct the wavelength to the Local System of Rest was read as zero even when correctly defined in the target list.

- [PHS-1362] Spectral Survey Message

  Effect: The message that sometimes appeared when selecting a Spectral Survey AOR, advising erroneously that only the WBS is used in this mode has been removed.

Chapter 6. SPIRE PACS Parallel Mode-related HSpot updates:

This section describes the main updates to HSpot that have been made, which are relevant to SPIRE PACS Parallel Mode users, implemented since the release of the updated version for the OT1 Call was made was made (HSpot v5.1). Parallel mode users are strongly recommended to read this document in conjunction with the SPIRE PACS Parallel Mode Observers' Manual and the HSpot Users' Guide.

6.1. General changes to SPIRE PACS Parallel Mode AOTs

- There are no significant changes in HSpot 5.3.1 relative to HSpot 5.2.3.