



Herschel duplication policies

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1. Background

The Herschel Space Observatory mission lifetime is cryogen limited, when all helium has been used up the observatory will cease to function. As stated in the Announcement of Opportunity (AO) Policies & Procedures document, in order to maximise the overall science return of Herschel newly proposed observations which duplicate observations already approved in previous proposal cycles will not be permitted, save in certain, clearly defined cases.

The policy that will be followed to resolve duplication issues is that if a proposed observation essentially **duplicates the science** contained in any of the **observations already approved for execution**, then it will be considered a duplicate observation.

In practice, duplications will be determined on a case by case basis by consideration of the target observed, the observing mode used, the observation parameters (e.g. similar spatial coverage, size and depth of maps, considerable overlap between wavelength ranges when using the same instrument for spectra, same filters for photometric observations) and the scientific objective.

This memo provides the necessary clarifications regarding what to consider as a potential duplication and the policies and procedures to follow when such cases are identified either by the user before proposal submission or by the Herschel Science Centre (HSC), the HOTAC, or other observers (see sec.6) after proposal submission. The current version of this document (v2.0) specifically addresses the conditions applicable to the second (and final) in-flight Announcement of Opportunity (AO) for Herschel Open Time (OT2) proposals.



2. Duplicated observations

In general, two observations are considered to be duplications if they are executed on the same position of the sky and covering the same spectral region (this must be interpreted as: same photometric filter for imaging observations; same spectral line for line spectroscopy or same spectral range for range spectroscopy) when any of the following conditions are met:

- Both observations are performed with the same instrument and Astronomical Observation Template (AOT) (*)
- One observation is performed with PACS line spectroscopy and the other with PACS range spectroscopy
- One observation is performed with PACS photometer and the other with SPIRE PACS parallel mode
- One observation is performed with SPIRE photometer and the other with SPIRE PACS parallel mode

Unless at least one of the following conditions are also applicable:

- The areas in the sky covered by two proposed imaging observations do not overlap by more than 25% of either of the fields/areas being compared
- The integration time per area of the sky for each observation differs by at least a factor of 4 (corresponding to a factor of 2 in sensitivity)
- The spectral range covered by two proposed spectroscopic observations do not overlap by more than 25% of either of the spectral ranges being compared.
- In the case of line spectroscopy the integration time on the same spectral line differs by at least a factor of 4 (corresponding to a factor of 2 in sensitivity)
- In the case of range spectroscopy, the integration time on the same spectral range differs by at least a factor of 4 (corresponding to a factor of 2 in sensitivity)

One natural exception to the above policy are observations of time-variable phenomena. In this case, a single epoch observation of a given target/sky field will not disallow a subsequent request for a time-series of observations, made after the former was approved for execution.

(*) Astronomical Observation Templates are: PACS line spectroscopy, PACS range spectroscopy, PACS photometer, SPIRE spectrometer, SPIRE photometer, SPIRE PACS Parallel mode, HIFI single point, HIFI mapping, and HIFI spectral scan observations.



3. The Reserved Observation List (ROL)

The list of approved observations which cannot be duplicated by other proposers is contained in the so-called 'Reserved Observations List'.

This list is regularly updated to reflect the latest contents of the operational database and in particular it is updated every time when there is a new set of observations approved following each call for proposals and/or after new discretionary time observations are approved. Currently, it contains all observations of the GT and OT Key Programmes, the observations approved in the AO-1 call as part of GT1 or OT1 programmes, and the recently approved observations in GT2 programmes, all of them previously approved by the HOTAC. In addition, observations approved as Director's Discretionary Time (in DDT or TOO programmes), and the small set of observations executed as fillers belonging to the so-called 'Observatory' (OBS) programme are also part of the Reserved Observation List.

None of the observations which are part of the Reserved Observations List can be duplicated by new proposers, with the exception of those observations belonging to proposals approved in the OT1 call as priority 2 – so called "OT1p2" - programmes. These observations appear clearly indicated as 'priority 2' in the Reserved Observations List and will not be blocked for OT2 proposers (see Sec. 6).

4. The Herschel Reserved Observation List Search Tool (HROST)

The Herschel Reserved Observation List Search Tool (HROST) is a java-based application (requires Java 1.6 or higher) which can be used to query the Reserved Observation List. It is available through the HSC web pages under the 'Tools' button, or by directly typing the following URL:

<http://archives.esac.esa.int/hsa/rost/index.html>

Once the application is launched queries are made by entering a position in the sky and a search radius as input and the tool returns as output a summary description of all AORs in the database overlapping your search area and their associated priority. Potential duplications found using this tool can be further investigated in detail using HSpot. You can access and download those AORs of your interest by using the option 'View accepted proposals' under the 'File' menu in HSpot.



5. The Herschel Duplication Checker (HDC)

Additionally, for the OT2 call a Herschel Duplication Checker (HDC) will be provided. This is a standalone web-based tool developed at the HSC that identifies all AORs in your proposal that potentially duplicate other approved science observations which are part of the ROL. It will be made available through the HSC web pages at:

<http://herschel.esac.esa.int/Tools.shtml#HDC>

The input file for this tool is any AOR file saved from HSpot using the option "Save AOR(s) and Target(s)" under the 'File' menu of HSpot. The output is the list of AORs which are found to be potential duplications of approved observations in the ROL.

Before proposal submission users must check that their programme AORs are not duplicating any existing observations in the ROL using this tool. **Any remaining potential duplication identified by the Herschel Duplication Checker must be justified in the duplications section of the proposal.** If the duplication is confirmed and is not adequately justified, the observation will be removed from the programme.

6. Duplication checks: policies and procedures

It is the responsibility of any investigator to avoid proposing duplicate observations. Users are requested to check for the existence of potential duplications among their proposed observations by using the Herschel Reserved Observations Search Tool (HROST) and the Herschel Duplication Checker (HDC) ahead of proposal submission. Any proposed observation deemed a potential duplication considering the criteria specified in Section 2 and flagged as such by the Herschel Duplication Checker (HDC) will in general be forbidden and the duplicated observations removed from the proposal unless an acceptable justification is provided in the dedicated section of the proposal submission form. The user must explain why the proposed observations should not be considered as duplications.

Exceptionally, newly proposed observations that are confirmed duplications can still be considered for approval if there are solid reasons behind, on a case by case basis. Examples include observations of large areas of the sky where cutting out a small area to avoid overlap with a previously approved observation



results in less efficient usage of Herschel observing time. These cases need the approval of the Herschel Project Scientist, or his designee.

In general, the data corresponding to an approved duplicate observation will be embargoed by the HSC (thus not released) until the proprietary rights of the original observer end, unless an agreement is reached with the owner of the already approved observations to lift this embargo in advance.

Although the HSC will make every effort to identify all duplicate observations, it is also the responsibility of the Principal Investigators of approved programmes to check the Reserved Observations List after every call to determine if any of the newly approved AORs are duplicating their approved observations. The HSC should be alerted if any such case is detected.

Duplication checks will be systematically performed by the HSC on the submitted proposals as part of the standard technical checkout immediately after the closure of every call. The newly submitted AORs will be verified for non-duplications against previously accepted AORs as well as among the proposals submitted in the same call. The HOTAC will be informed of the identified duplications in each round of submissions and allocate time eventually based on scientific arguments. However, the HOTAC is expected to solve only the most obvious cases, where duplications are identified at proposal level (e.g. those proposals showing a considerable degree of overlap), while the HSC will take care of all the remaining duplications, once the HOTAC results are available.

These are expected to correspond to those accepted proposals where the level of overlap with already approved proposals or with proposals submitted in the same call is relatively small in terms of observing time, and the number of duplicated AORs is reduced, and will be resolved on a case by case basis.

For the resolution of the detected duplications in the accepted OT2 proposals the following criteria will be used:

- 1) If an OT2 observation is duplicating an observation from a previous call with the same or higher priority, the OT2 duplicating observation will automatically be removed, and the time allocated reduced accordingly. (This rule covers all cases but two, that are dealt with in 2 and 3 below.)
- 2) If an OT2 observation is duplicating an observation from a previous call with lower priority, i.e. an OT2p1 observation is duplicating an OT1p2 observation:



- a. the OT2p1 duplicating observation will be removed in the case the OT1p2 observation has already been executed at the time of the announcement of the HOTAC results.
 - b. the OT2p1 duplicating observations will be kept and the OT1p2 observation will be removed if not executed at the time of the announcement of the HOTAC results. In such cases, the successful OT2p1 proposer will have to share the data with the original OT1p2 proposer. They both get the data equally, and with the same proprietary rights. Formally, the time allocation of the OT1p2 proposal will be reduced accordingly.
- 3) In the case of duplications among OT2 proposals, priority will be given to those observations in the proposal that received the highest grade in the review process. The higher ranked proposal will be allowed to keep the observations while the other(s) will have to remove the duplicated AOR(s). The time allocation of the lower ranked proposal will be reduced accordingly.

The results of this duplication analysis will be communicated to the users by the HSC at the time of the notification of the HOTAC outcome.

It is important to note that the Herschel Project Scientist, or his designee, will always have in any case the final authority to either allow or disallow duplicated observations.