



Announcement of Opportunity for Open Time (OT1)

Policies and Procedures

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Policies and Procedures

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Table of Contents

1. Introduction	1
1.1. Overview	1
1.2. Scope	1
1.3. Acronyms	2
2. OT1 AO package	4
2.1. AO documentation	4
2.2. AO tools	4
2.3. Associated documentation and tools	5
3. OT1 AO schedule	6
4. Observing time	7
4.1. Total amount of observing time	7
4.2. Guaranteed and Open Time	7
4.3. Allocated observing time	7
4.4. OT1 Herschel observing time	8
4.5. OT1 joint Herschel/XMM-Newton observing time	8
4.6. AOTs and AORs	8
4.7. Observing constraints	9
4.7.1. Scheduling strategy	9
4.7.2. Spacecraft 'slewing' overhead charges and time constrained observations	9
4.7.3. Duplicate observations	10
4.8. Targets of Opportunity	10
5. 'Large' and 'Normal' Programmes	12
6. Phase 1 proposal submission	13
6.1. Submission procedures	13
6.2. Proposal contents	13
6.2.1. Cover sheet	14
6.2.2. Scientific justification	14
6.2.3. Astronomical Observation Requests	16
6.3. Proposal submission	17
7. Proposal evaluation and selection	18
8. Phase 2 data entry and reserved observations	20
9. Post-call modifications	21
10. Further calls for proposals	22
11. Data products and proprietary rights	23
12. Special information for US-based investigators	24

Chapter 1. Introduction

1.1. Overview

The Herschel Space Observatory (aka Herschel) was successfully launched on 14 May 2009. It has been designed to provide the astronomical community with a facility to carry out routine astronomical observations for a period of at least three years. General information about the Herschel mission, the observatory, its instruments, and the ground segment is provided in the [Herschel Observers' Manual](#).

The majority of Herschel's observing time is made available to the astronomical community by the traditional route of calls for observing proposals, followed by peer review, in response to Announcements of Opportunity (AO), issued by the Herschel Science Centre (HSC). The observing time consists of Guaranteed Time (GT) and Open Time (OT). The GT (32% of the available time) is owned by contributors to the Herschel mission, mainly the science payload consortia. The remainder time is OT, that is awarded in a standard competitive manner to investigators worldwide. All observing proposals are reviewed by the Herschel Observing Time Allocation Committee (HOTAC).

This is the first in-flight Herschel AO, and currently open time (OT1) observing proposals are solicited for. The guaranteed time part (GT1) has already been conducted. There is one year's worth of observing time available to be allocated in OT1: 6592 hours.

There are two kinds of proposals: 'large' proposals for programmes requiring observing time in excess of 100 hours, and 'normal' proposals, for observing programmes requiring up to 100 hours. All proposals will be subjected to scientific and technical evaluation of the proposed observations, and checking with respect to the 'Reserved Observations List' (ROL) which together with the duplication policy is considered part of the AO package.

There is the possibility - under certain conditions - to apply also for XMM-Newton observing time as described in Section 4.5.

Responding to the AO is a two-phase process. Responses to this call consist of so-called Phase 1 proposals. After peer review by the HOTAC, successful proposers will have the opportunity to update their observations under the technical advice of the HSC according to the recommendations made by the HOTAC entering them into the Herschel database in their final version (Phase 2).

Another call will be issued in about a year's time as described in Chapter 10 and will be accompanied with its corresponding Policies and Procedures document.

1.2. Scope

The present version of this document provides the rules applicable to the OT1 AO and the procedures to be followed to apply for observing time with Herschel as a response to the call. All OT1 proposers are required to follow the policies and procedures described in this document.

A summary description of the contents of this document section by section is as follows:

- The full AO package is described in Chapter 2.
- The detailed AO schedule is provided in Chapter 3.
- An overview of the observing time available and the possibility to apply for XMM-Newton observing time is presented in Chapter 4.
- The concept of 'large' and 'normal' proposals is further explained in Chapter 5.
- Details of the Phase 1 proposal submission procedure are given in Chapter 6.

- Details of the evaluation and selection processes are given in Chapter 7.
- The entry of the final observation details, i.e. the Phase 2 process, and the reserved observations list are described in Chapter 8.
- Post-call modifications to approved proposals are addressed in Chapter 9.
- Information about the foreseen further call is provided in Chapter 10.
- Information on data products and proprietary rights can be found in Chapter 11.
- Finally, special information which is applicable only to investigators based in the USA can be found in Chapter 12.

1.3. Acronyms

The following acronyms are used in this document:

- AO : Announcement of Opportunity
- AOR : Astronomical Observation Request
- AOT : Astronomical Observation Template
- DA : (NASA) Data Analysis
- D/SRE : (ESA) Director of Science and Robotic Exploration
- ESA : European Space Agency
- ESO : European Space Observatory
- FAQs : Frequently Asked Questions
- GT : Guaranteed Time
- HCNE : Herschel Confusion Noise Estimator
- HCSS : Herschel Common Science System
- HIFI : Heterodyne Instrument for the Far Infrared
- HIPE : Herschel Interactive (data) Processing Environment
- HOSS : Herschel Optical System Scientist
- HOTAC : Herschel Observing Time Allocation Committee
- HROST : Herschel Reserved Observations Search Tool
- HSA : Herschel Science Archive
- HSC : Herschel Science Centre
- HSpot : Herschel observation planning tool
- HST : Hubble Space Telescope
- ISO : Infrared Space Observatory

- KP : Key Programme
- LP : Large Programme
- MS : Mission Scientist
- NASA : National Aeronautics and Space Administration
- NHSC : NASA Herschel Science Center
- NP : Normal Programme
- OT : Open Time
- PACS : Photodetector Array Camera & Spectrometer
- PDF : Portable Document Format
- PI : Principal Investigator
- ROL : Reserved Observations List
- RSP : Routine Science Phase
- SDP : Science Demonstration Phase
- SMP : Science Management Plan
- SPIRE : Spectral and Photometric Imaging Receiver

Chapter 2. OT1 AO package

2.1. AO documentation

The OT1 AO package consists of the following documents:

- [Herschel OT1 Announcement of Opportunity](#): This is the formal letter from the ESA Director of Science and Robotic Exploration inviting the scientific community to apply for the Herschel OT1 observing time.
- [Executive Summary](#): Summarises the document package, providing the reader with an overview and help on where to find the relevant information.
- Policies and Procedures (this document): The 'administrative' part of the call documentation, providing all necessary information about the policies adopted and the procedures to be followed.
- [Herschel Observers' Manual](#): Describes Herschel as an observatory facility, providing the background information that every proposer needs.
- [HIFI Observers' Manual](#): Provides instrument specific information and describes how to use HIFI to perform observations.
- [PACS Observers' Manual](#): Provides instrument specific information and describes how to use PACS to perform observations.
- [SPIRE Observers' Manual](#): Provides instrument specific information and describes how to use SPIRE to perform observations.
- [SPIRE/PACS Parallel Mode Observers' Manual](#): Provides specific information and describes how to use SPIRE and PACS simultaneously to perform so-called 'parallel mode' observations.
- [HSpot Users' Guide](#): Provides information about the Herschel observation planning tool HSpot and how to use it for the preparation of observing proposals.
- The Reserved Observations List which is searchable using the Herschel Reserved Observations Search Tool (HROST, see below). Information on the accepted observations contained in the GT and OT Key Programmes and GT1 proposals (proposal id, title, PI name and institution, and links to the abstracts) is provided in the AO web pages, together with instructions on how to access their associated AORs through HSpot as well as on how to search the database of Reserved Observations to avoid potential duplications.

Furthermore, there will be a special AO document called [Latest News](#), available through the web only. It will provide late additions or corrections to the documentation package after the issue of the call for proposals. Proposers should consult this web document regularly.

2.2. AO tools

The AO OT1 package also includes the following tools:

- [HerschelFORM PDFLaTeX package](#): This is the LaTeX package that must be used for OT1 proposal generation, this is mandatory. It consists of a template proposal form and several class and style LaTeX files to ensure that all proposals will share a standard format and follow the page limit rules defined in this document. Note that there are two separate different versions of the template, one for 'large' and another one for 'normal' proposals, with different page allocations. It is based on the ESIFORM LaTeX package, originally developed by the ESO User Support System (USS) Department, adapted to Herschel needs.

- [Herschel Reserved Observations Search Tool](#) (HROST): This is a java-based web tool developed at the HSC to search the so-called 'Reserved Observations List'. This is a list consisting of those observations already accepted, which cannot be duplicated by proposals to be submitted.
- [HSpot](#): This is the software tool for planning Herschel observations and submitting proposals, which has been built starting from the tool originally developed for the Spitzer Space Telescope called 'Spot', thus 'Herschel-Spot' or simply 'HSpot'. HSpot allows you to design, plan, and optimise an observation, and to determine how much time will be required to execute it. In addition, it also includes visualisation tools to permit the general observer to see how proposed Herschel observations will be laid out on the sky. The look and feel of this tool is that of the Spitzer tool, but it has been fully adapted for Herschel. It also performs background and confusion noise estimation. HSpot can be downloaded from the HSC web pages.

2.3. Associated documentation and tools

In addition to the main AO documentation and tools listed above, other complementary information and tools are also available through the HSC web pages. Among them:

- Herschel Background Estimator: This is the infrared background estimator provided in HSpot, which is an extended version of the tool developed for the Spitzer Space Observatory. The background estimator provides the total brightness at a given sky position, as well as the breakdown into its components over the entire Herschel wavelength range.
- Herschel Confusion Noise Estimator (HCNE): The HCNE provides estimates for the confusion noise (i.e. uncertainty of flux determination due to the sky background) for the photometric bands of the Herschel PACS and SPIRE instruments. The confusion noise is specific for the selected observing mode and is derived considering the two main astrophysical components in the far-infrared: the Galactic cirrus and the cosmic infrared background.
- Presentations given at the [Herschel First Results Symposium](#) (aka ESLAB 2010) held on 4-7 May 2010 are publicly available.
- The accepted papers for the Herschel Special Letters Issue of Astronomy and Astrophysics - and as time progresses for other issues and other journals - are generally available on [astro-ph](#).

Chapter 3. OT1 AO schedule

The sequence of dates for the current first in-flight Announcement of Opportunity (AO) for Herschel Open Time (OT1) is as follows:

- 20 May 2010: The Herschel OT1 Announcement of Opportunity is issued. Phase 1 OT1 proposals can be submitted.
- 3-4 June 2010: A [Herschel Observation Planning Workshop](#) will be organised by the HSC in ESAC, Madrid, and simultaneously by the [NHSC in IPAC](#), Pasadena.
- 22 July 2010 12:00 UT: Submission deadline for Phase 1 OT1 proposals. Start of technical and HOTAC evaluation process for these proposals.
- 2 August 2010: Submission deadline for NASA data exploitation funding for investigators based in the USA only, see Chapter 12.
- 11-15 October 2010: HOTAC meeting, after which the recommendation regarding OT1 proposal time allocation will be provided to ESA's Director of Science and Robotic Exploration (D/SRE) for final decision.
- 1 November 2010: Announcement of approved proposals and start of Phase 2 data entry.

Note that 12:00 UT refers to 12:00 hours (noon) Universal Time (UT=GMT). Central European Summer Time (CEST) is UT+2 hours on 22 July 2010.

After the the current AO process there will be one additional call cycle for observing programmes: GT2 and OT2 proposals, currently foreseen to take place in approximately one year's time, as specified in Chapter 10.

Chapter 4. Observing time

4.1. Total amount of observing time

Herschel is designed to provide at least three years of Routine Science Phase (RSP) observations after the initial mission phases including the Science Demonstration Phase (SDP, see the [Herschel Observers' Manual](#)). The current best estimate of the mission lifetime still has a significant uncertainty, being in the range 3.5-4 years, but providing confidence in achieving three years of RSP operations.

The total available observing time to be allocated to GT and OT observers in the nominal three year RSP is 19,776 hours. This figure is obtained from 21 hours schedulable observing time per day for 3x365 days, minus 14% which has been reserved for observatory calibration and engineering observations; i.e. $(21 \times 3 \times 365) \times 0.86 = 19,776$ hours.

Although there are many conceivable reasons for why the actual amount of available observing time may differ from this number, in both positive and negative sense, this nominally available observing time is adopted for conduction of the AO process.

4.2. Guaranteed and Open Time

As it has already been mentioned, the Herschel observing time is divided into Guaranteed Time (GT) and Open Time (OT). Of the total available observing time 32% is GT, i.e. 6328 hours for the 3 year mission. The remaining 68% of the time is awarded as OT, i.e. 13448 hours for the 3 year mission. A maximum of 4% of the Open Time can be allocated in programmes as discretionary time.

The GT holders and their allocated times are as follows:

- Instrument Principal Investigators (PIs) each own 30% of the GT, thus each instrument PI owns 1898 hours of GT.
- The Herschel Science Centre (HSC) owns 7% of the GT, thus the HSC owns 443 hours of GT.
- Mission Scientists (MSs) each own 0.6% of the GT, thus each MS owns 38 hours of GT.
- The Herschel Optical System Scientist (HOSS) owns the same amount of time as an MS, i.e. the HOSS owns 38 hours of GT.

4.3. Allocated observing time

An important element of the Herschel mission is the concept of Key Programmes, introduced in the previous dedicated pre-launch AO, as a mechanism to ensure that large programmes (in the range 100-1000 hours), requiring a great deal of observing time, could be proposed, selected and executed. These programmes were intended to exploit the unique Herschel capabilities, addressing important scientific issues in a comprehensive manner, generating well characterised data sets of high archival value and the need for follow-up observations.

The three major GT owners, the instrument PIs, were required to spend a minimum of 50% of their GT on Key Programmes, with no specified maximum, while there was no such requirement on the remaining minor GT holders. The outcome of the GT KP process is that in excess of 90% of the total available GT time has been spent in the form of Key Programmes.

Regarding the OT, the HOTAC was free to approve proposals requiring up to a maximum of 40% of the total nominally available OT in the form of Key Programmes and this was actually the amount of time eventually allocated.

In the end by coincidence 21 GT as well as 21 OT Key Programmes were awarded observing time. Altogether in the [KP AO](#) cycle approximately 11,000 hours of observing time were allocated. Furthermore, in the [GT1 AO](#) process another 550 hours have been allocated in the form of 'normal' proposals.

4.4. OT1 Herschel observing time

In the current OT1 AO process one year's worth of Herschel observing time is available for allocation, amounting to 6592 hours.

4.5. OT1 joint Herschel/XMM-Newton observing time

With the aim of taking full advantage of the complementarity of ESA's observing facilities, it has been agreed to establish an environment for scientific programmes that require observations with both to achieve the desired scientific results. By joint agreement in the current OT1 AO process there is up to 500 ks of XMM-Newton observing time available for allocation by the HOTAC. There is no mechanism whereby the XMM-Newton TAC can allocate observing time on Herschel.

XMM-Newton observing time can be requested for those programmes where the science objectives require:

- Simultaneous or quasi-simultaneous Herschel and XMM-Newton observations, or
- short (max. 10 ks) snapshot-type XMM-Newton observations of newly detected and likely variable sources which require scheduling within a year after the Herschel observation.

Proposers wishing to make use of this opportunity have to submit a single proposal in response to the Herschel OT1 AO indicating the request for XMM-Newton observing time in the appropriate section of the proposal submission form. Although time is requested on both observatories, it will be unnecessary to submit proposals to two separate TACs. The science case for all proposals submitted to Herschel will be reviewed exclusively by the HOTAC.

The primary criterion for awarding observing time to joint Herschel/XMM-Newton programmes is that both Herschel and XMM-Newton data are required to meet the scientific objectives of the proposal. It must be noted that the minimum XMM-Newton observing time is 5 ks. In addition, each observation requires 3 ks for instrument setup. In the case of Herschel observation times exceeding the minimum XMM-Newton observation time, the allocated XMM-Newton observing time cannot exceed the allocated Herschel observing time. Neither target of opportunity nor any other type of observations with a reaction time of less than 8 weeks from an unknown triggering date will be considered for this cooperative programme.

It is the proposers' responsibility to provide a full and comprehensive scientific and technical justification for the requested observing time on both facilities. Both the XMM-Newton and the Herschel observatories, will perform feasibility checks of the proposals. They each reserve the right to reject any observation determined to be unfeasible for any reason. For more information on XMM-Newton consult their website at <http://xmm.esac.esa.int>.

Apart from the above, for both the XMM-Newton and the Herschel observatories, the general policies and procedures currently in force for the final selection of the proposals, the allocation of observing time, the execution of the observations, and the data rights remain unchanged.

4.6. AOTs and AORs

Proposers may apply to use any of the pre-defined instrument observing modes described in the Observers' manuals. These pre-defined observing modes or 'Astronomical Observation Templates' (AOTs) are made available through HSpot. Once an AOT has been chosen, the detailed observing

parameters for that particular observing mode need to be entered using HSpot resulting in an 'Astronomical Observation Request' (AOR). AORs are the primary units of Herschel observing time.

4.7. Observing constraints

4.7.1. Scheduling strategy

Herschel observing will be conducted autonomously without real-time interaction. This means that observers are not expected to be present at the HSC while their observations are carried out.

All observations have to be specified in full detail by the proposers using HSpot well in advance to the time when the observations will actually be executed. For a variety of reasons including efficiency, sky coverage and instrument operation constraints, Herschel mission planning will distribute the available observing time among accepted proposals on a 'per observation' (AOR) basis. This is the way other space-based facilities like the Spitzer Space Telescope and the Hubble Space Telescope (HST) operate, and it was also the case of Herschel's precursor, the Infrared Space Observatory (ISO).

Similarly, it must be emphasised here that - for operational reasons - no guarantees can be given that any particular observation (AOR in the case of Herschel) within an accepted proposal will, in fact, be executed, although every attempt will be made to achieve this objective. Note that no grades are assigned to individual AORs accepted for execution. This means that the final scheduling sequence will be based solely on maximising the telescope observing efficiency.

4.7.2. Spacecraft 'slewing' overhead charges and time constrained observations

Slew times between observations are charged over all AORs as a flat 3 minutes overhead. This overhead time is automatically applied to all non-time constrained observations entered through HSpot.

However, time constrained observations can also be defined using HSpot. These are:

- All observations entered in HSpot using the timing constraints window.
- All observations entered in HSpot using the Group/Follow-on constraints, with the exception of concatenations
- Observations requesting an orientation constraint or a chopper avoidance angle.

Time constrained AORs reduce the flexibility of scheduling and the overall observing efficiency. For this reason they are further penalised, in terms of overhead charges, with a 10 minutes slew overhead in HSpot, instead of the 3 minutes applicable to non-constrained AORs. Programmes with heavily constrained AORs will need to be accompanied by a compelling justification.

Concatenated observations are charged 3 minutes overhead per AOR, unless observing the same target (no slew, see also below), then only 3 minutes overhead for the entire chain is charged.

If a concatenated chain is time constrained, then the overhead charge is 10 minutes for the first AOR, and 3 minutes for each following AOR, unless observing the same target, then only 10 minutes for the entire chain is charged.

Concatenation between 2 AORs is permitted:

- For scientific reasons as motivated in the proposal.
- For nearby targets. Two targets are nearby if they are separated in the sky by less than 1 degree. A target can be celestial (fixed position) or a solar system object (moving position).

- Using the same sub-instrument only: the applicable 'sub-instrument' definitions are:
 - The PACS photometer and spectrometer are separate 'sub-instruments';
 - The SPIRE photometer and spectrometer are separate 'sub-instruments';
 - The SPIRE PACS parallel mode is a separate 'sub-instrument';
 - The seven HIFI LO bands are separate 'sub-instruments';

4.7.3. Duplicate observations

In order to preserve the overall science efficiency of the observatory, duplicate observations will in general not be permitted. Checks for potential duplications (see the [Herschel Duplication Policies document](#)) between your planned observations and already approved AORs contained in the so-called 'Reserved Observation List' will be made by the HSC during the technical review of submitted proposals.

The 'Reserved Observation List', available in the HSC web page, contains all observations of the GT and OT Key Programmes and of the GT1 proposals previously approved by the HOTAC that cannot be duplicated by any OT1 programme. The list can be inspected by OT1 proposers using the [Herschel Reserved Observations Search Tool](#) (HROST).

This tool enables you to search all the AORs included in the current Reserved Observations List in a simple fashion through a java-based web interface (requires Java 1.6 or higher). Once you start the application you can make queries by entering a position in the sky and a search radius as input and the tool will return as output a summary description of all AORs in the database overlapping your search area. 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.

The HOTAC will be informed of the existing duplications in each round of submissions and will assign priorities (and allocate time eventually) based on scientific arguments, if considered necessary. Otherwise, the duplicated observations will be blocked and the PI's of those proposals containing duplicated AORs will be contacted by the HSC. They will be informed about the identified duplications and recommended to adapt their observing programmes in the most efficient way to maximise the scientific return of the mission.

This may imply the coordinated distribution of the duplicate observations among the proposals affected, saving time which can be used for including additional observations or deeper exposures of other targets; or sharing the data, if an agreement is reached by the corresponding PIs in this sense, increasing the synergies and/or complementarities between the observations originally proposed. Decisions adopted by the affected PIs must be communicated to the HSC before the observations are released for scheduling.

4.8. Targets of Opportunity

A Herschel target is considered a 'Target of Opportunity' (ToO) if the observations are linked to the occurrence of an event whose exact timing and/or location in the sky are unknown at the time of the proposal submission deadline. ToO targets include objects which can be identified in advance but which undergo unpredictable changes (e.g. some recurrent novae) as well as objects that can only be identified in advance as a class (comets, novae, supernovae, gamma ray bursts, etc). Herschel proposals consisting of ToO targets in full or in part must present a detailed observing plan for the observations to be performed if the triggering event occurs. A generic name and dummy coordinates (if necessary) will be entered through HSpot for this purpose. Integration times will be estimated as a function of the brightness assumed for the event. Backup strategies can also be proposed (e.g. for not-so-bright comets). The triggering conditions and the reaction times necessary to accomplish the scientific goals proposed must be clearly described and justified in the proposal.

The HOTAC may recommend the tentative allocation of observing time provided these conditions

are met and the reaction times required are compatible with Herschel operational constraints. It will be the responsibility of the proposer to urgently submit a ToO activation request to Helpdesk in case the conditions approved by HOTAC are satisfied. He/she will provide as well all the necessary information to initiate the preparation of the observations updating the details of the observations originally included in HSpot, if needed, so that the observations can be programmed at the earliest possible time, considering the reaction times solicited in the proposal.

In the event of a sudden phenomenon of a nature that could not have been anticipated, Herschel observations can also be requested through Director's Discretionary Time (DDT).

Chapter 5. 'Large' and 'Normal' Programmes

While the pre-launch AO was dedicated to Key Programmes (KPs) only, the in-flight AOs will not be restricted to a particular kind of proposal. The concept of KPs is no longer applicable to this call, however, the concepts of 'Large' and 'Normal' Programmes are introduced, LPs and NPs. An LP is an observing programme requiring in excess of 100 hours of observing time, all other observing programmes are NPs.

It is clear that the scientific motivation for an observing programme needing a especially large amount of observing time has to be particularly high and well justified. Since more than half of the total nominally available observing time for Herschel has already been allocated to LPs in the form of KPs this requirement is strongly emphasized in the current AO.

The above requirement is reflected in different page limits and additional demands on justifications for LPs as described in the Herschel PDFLaTeX form applicable to LPs.

Chapter 6. Phase 1 proposal submission

The response to this call for proposals is a two-phase process. Phase 1 is needed for every proposal while Phase 2 is only applicable to accepted proposals. In Phase 1, all proposals will go through peer review by the HOTAC, which will make a recommendation regarding time allocation to ESA's Director of Science and Robotic Exploration who will take the formal decision.

During Phase 2, the final version of these observations will be entered by 'successful' proposers into the Herschel database following the recommendations made by the HOTAC under the technical advice of the HSC. In both cases (Phase 1 and Phase 2), Herschel proposals must be prepared using HSpot, the software tool provided by ESA. For OT1 proposals, it is mandatory that the PDF file uploaded through HSpot must be generated using the HerschelFORM PDFLaTeX package distributed by the HSC. Proposals not generated using HerschelFORM PDFLaTeX package will automatically be rejected.

The following subsections describe the procedures to be followed and forms to be used for Phase 1 proposal submission, as applicable for OT1 proposers.

6.1. Submission procedures

As described in the schedule in Chapter 3 the OT1 proposals are due in the period between 20 May and 22 July 2010. In order to be able to submit a proposal using HSpot, the Principal Investigator (PI) must be registered first in the HSC as a Herschel services user. This can be done by clicking the 'User Registration' button in the HSC web page and following the instructions there. By registering, users will also be joining Herschel e-mail distribution list(s) enabling us in the HSC to provide them with information as needed.

The HSC will provide support and answers to questions that may arise during the preparation of observing programmes through the [Herschel Helpdesk](#) web interface. Note that only registered Herschel services users are enabled to get support via the Helpdesk. To aid quick and accurate processing of queries, questions must be classified by the users according to pre-defined topics when they are submitted. Upon submission, they will receive an auto-generated e-mail with a ticket id (do not reply to this e-mail message!) which can be used to monitor the status of the query at any moment via the web interface. The expected timescale for reply is a few working days at most. A list of Frequently Asked Questions (FAQs) and answers, updated regularly, is also available from the Herschel Helpdesk web pages.

'Normal' and 'Large' proposals must be submitted using HSpot. Remember that you need to be a registered Herschel services user to be able to do this. The latest HSpot version (5.0) to be used for this AO can be downloaded from the [HSpot download web page](#).

Registered users submitting proposals can verify that their proposals have successfully been received at the HSC using the [Proposal Handling](#) link under the Herschel User Services menu available from the HSC web pages. The user submitting the proposal is the proposal PI as seen by the system. The Proposal Handling System can be used by the proposal PI to define 'co-users' who can also view and update the proposal as many times as needed until the deadline. Only the proposal PI can define these 'co-users'. The actual updating and re-submitting of the proposal is done always using HSpot.

The submission of OT1 proposals must be completed before 12:00 UT on 22 July 2010. Proposals (or updates of proposals) received after the deadline will not be considered.

6.2. Proposal contents

A Phase 1 proposal contains three parts which are all submitted simultaneously from HSpot, but can be updated separately. These are:

- The proposal 'cover sheet'
- The scientific justification file
- The observations as prepared with HSpot

The AORs and the cover sheet information are entered directly into HSpot while the scientific justification is a single PDF file which is generated with the HerschelFORM PDFLaTeX package and submitted as an attachment to the proposal, as explained in Section 6.3 below.

The AORs and the cover sheet information created in HSpot can be saved to your local disk as text files and then reloaded in HSpot for further modifications as many times as needed prior to submission.

6.2.1. Cover sheet

The proposal cover sheet contains header-type information which is entered directly into HSpot by filling in the appropriate fields within the 'Proposal Submission Tool' window (under the 'Tools' menu in HSpot main window's toolbar).

- Select a concise title for your proposal
- Select the right programme from the pull-down menu ('OT1' for this AO).
- Enter the total amount of time requested (in decimal hours) in the proposal as calculated by HSpot.
- Enter, one by one, the names, affiliations and e-mail addresses of your co-I's.
- Write a short abstract (no more than 2040 characters including blank spaces) describing the main features of your proposal.
- Choose one (and only one) among the science categories offered as a choice in HSpot into which you feel your proposal fits better from the broad Extragalactic, Galactic, or Solar System headings. This information will be used to distribute proposals to the panels for the review.
- Add any other text which you may consider convenient to be placed in the cover sheet (otherwise leave it blank).

Note that the PDF file containing the scientific justification of the proposal is not part of the cover sheet. It only needs to be uploaded at the precise moment when the proposal is being submitted.

6.2.2. Scientific justification

The 'scientific justification' part of the proposal must be contained in a separate PDF file which is ingested in HSpot as an additional input to the 'Proposal Submission Tool' window above described.

The PDF file must be generated using the HerschelFORM PDFLaTeX style macros following predefined templates provided by the HSC. There is one for 'normal' proposals and another one for 'large' proposals, as defined in Chapter 5. The class and style files, the template files themselves and a Users' Manual containing all the information required to fill the templates and generate the corresponding PDF files are all made available as part of the HerschelFORM PDFLaTeX package at the HSC web pages.

There is a strict limit in the number of pages allocated for each individual section of the proposal, depending on the proposal class ('normal' or 'large'; see below). Proposals requesting joint Herschel/XMM-Newton observations will need to add the scientific case which explains the need for coordinated observations. Please note that the text entered under a given section exceeding these page limits will not be visible in the output PDF file. Note as well that the maximum size of the resulting pdf file is 5 Mb (including figures). Any colour figure in the proposal should be interpretable even if

printed with a black and white printer. The proposal contents and page limits (including figures and tables) are as follows:

Science rationale (max 4 pages for 'large' proposals'; 3 pages for 'normal' proposals)

- Scientific goals. Proposals must indicate here the main science goals to be achieved and an explanation of why they cannot be met using other facilities or methods. A description of the relevance of the proposed science to astronomy should be given indicating why the Herschel capabilities are unique in advancing knowledge in the proposed area of research.
- Science exploitation plan. This section should contain a brief description of the plans to exploit the data from the scientific point of view in the first year after the observations have been made. The science plan should be readily comprehensible to broad-based scientists.
- Relation to observations with other facilities. If applicable, it should be outlined here how the proposed Herschel observations will be complemented by other data (past, present or future - Herschel or other facility), whether such other data are essential for the analysis and interpretation and how the Herschel observations may be followed up. Also details of any linked proposals with other observatories should be mentioned. In particular, the need for coordinated observations with XMM-Newton should be justified here. Joint Herschel/XMM-Newton proposals must include here a detailed description of the observations to be performed with XMM-Newton, indicating clearly the observing strategy and number of seconds requested.

Technical implementation (max 1 page)

- Observing strategy. A detailed justification should be given here of the specific observing modes proposed and of the choice of observing parameters made. Arguments should be given here to support the overall observing strategy proposed. Information should be provided about criteria used for target selection, including quantitative descriptions of the expected target flux densities or surface brightness at the relevant wavelengths, required sensitivity, wavelength and coverage strategy (including redundancies).
- Observing time requirements. The total amount of time requested in the proposal should be justified here. The numbers provided should be based on the resource estimates calculated by HSpot. For Herschel OT1 proposals the full set of AORs must be submitted in Phase 1. The calculations presented should also demonstrate, if applicable, that the proposers have checked the background and confusion noise expected as derived from the available estimators, as well as the maximum expected flux densities or surface brightness in the fields of view or spectral apertures to be used.
- Other special requirements or constraints. Time constraints, concatenations, avoidance angles for chopper orientation, specific position angles for maps, or any other special requirement or constraint entered through HSpot should be justified here. In general, constraints are detrimental to overall mission planning efficiency. The lower efficiency is hidden in the longer average slewing times between observations. As already mentioned in Section 4.7.2, time constrained observations are charged for 10 minutes slew overhead instead of the 3 minutes applicable to non-constrained observations. The overheads applicable to every constrained observation entered through HSpot are automatically charged following the rules defined in Section 4.7.2).
- Duplication analysis. Indicate clearly here the result of your duplication checks using HROST. If there are potential duplicate observations in the Reserved Observations List please justify here why your proposed observations should not be considered a duplication, or, alternatively, why duplicated observations are requested (e.g. to search for variability).

Data processing plans and archival value (max 1 page)

- Data processing and analysis plan: for product generation, validation and delivery. The resources available to the proposers team on this area should be described here. The nature and scope of

the data products and software tools will vary from one proposal to another, depending on the nature of the programme. It will be up to the applicants to specify in detail what they propose to provide and the benefits to the community.

- Product generation methods. In developing software for their own data-analysis purposes, proposers teams are likely to employ a variety of coding languages, styles, levels of commenting and documentation, and platforms. It is required to provide clear documentation explaining and describing the assumptions, parameters, and algorithmic steps implemented in such a way that someone else could reproduce the results, detailed enough that the results can be independently verified. Use of HIPE, the Herschel specific data processing and interactive analysis software is encouraged in order to make distribution and usage simple to other astronomers.
- Archival value (for 'large' proposals only). As emphasised in the concept definition of 'large' proposals, the observational data are expected to have a long-lasting archival value. This means that the proposers will be expected to focus on certain aspects of the data and science case during the proprietary period, leaving other aspects for future exploitation open to the community. The baseline plans for data exploitation by the consortium are outlined in an earlier section. Here the envisaged archival value and long term benefits of the data set should be described. This should be based not only on the immediate data products which the proposers are expected to provide at the end of the proprietary period, but on the final 'mature' products that are foreseen to be available eventually via subsequent more sophisticated data-processing and calibration.

Management and Outreach plan (max 1 page)

- Team resources and management plan. This section should include an explanation of the strengths and track records of the team that make it appropriate for the project. It should contain a summary of staff and other resources that will be committed to the programme. Also the proposal should contain the team management and/or organisational structure and a brief summary of the project schedule and management plan.
- Outreach activities. This section should outline the team's plans on the publication and dissemination of the science results obtained with Herschel to a wider audience than the Herschel community itself. In particular, any systematic efforts planned on the area of sharing the new scientific knowledge provided by Herschel with the general public through outreach activities will be considered as a bonus in the evaluation process.

The following two sections are also required but not subject to page limitations.

List of team members with associated roles

- A list containing names, affiliation, status (i.e. professor, postdoc, student or else) and relevant qualifications (not full CVs!) of all investigators collaborating in the proposal. Particular emphasis should be made on the roles they are going to play in the work to be done, in connection with the management plan presented in the previous section. Here a list can also be given containing a small number of major publications made by the team members related to the proposed research.

Observations summary

- A few lines of text containing a high level, schematic description of the proposal observations indicating the kind of data that will be collected including the identification of sub-proposals (if such constituents can easily be identified). The text must be accompanied by a small summary table following the template provided in the HerschelFORM package.

6.2.3. Astronomical Observation Requests

These are the Astronomical Observation Requests (AORs) as prepared with HSpot, containing full details about the observing parameters which completely defines the way in which a given observation will be executed.

The submitted AORs should be the final ones you expect to have scheduled if the proposal is successful. For OT1 proposals the entire set of AORs must be submitted already in Phase 1. No additional AORs, nor changes of targets or observing modes will be allowed in Phase 2, with the exception of those explicitly mentioned as backup targets/strategies in the original proposal. Otherwise, only the observation parameters of AORs already submitted in Phase 1 can be edited in Phase 2, if this is considered necessary by the proposer. Other changes will only be allowed if they have been recommended by the HOTAC, or by the HSC for technical reasons.

6.3. Proposal submission

Proposals must be submitted to the HSC electronically through HSpot, and shall be consistent with the page and format guidelines given in Section 6.2. Note that this is enforced by the usage of the HerschelFORM PDFLaTeX package, which is mandatory.

When your proposal is ready to be submitted to the HSC you need to open a HSpot session and ensure that:

- your computer is connected to the Internet;
- the set of AORs loaded into the AOR window of HSpot are the ones associated to the proposal that you want to submit;
- the cover sheet information that you see in the 'Proposal Submission Tool' window is correct, including the total requested time consistent with the associated AORs;
- the PDF file to be uploaded containing the scientific justification file has correctly been chosen and corresponds to the proposal that you want to submit.

It is recommended to compute all time estimates before proceeding with proposal submission. In case there is any AOR for which time estimation has not been run or shows an out of date value, the system will force you to run time estimation and bring it up-to-date at the time of proposal submission.. This will serve as an additional validation to ensure that the time requested on the cover sheet is consistent with the latest time estimation made by HSpot. If everything is OK, click on 'Submit proposal to the HSC' under the 'Submit' menu of the 'Proposal Submission Tool' window's toolbar. A new window will appear in your screen where you will be prompted to enter the username/password combination which is your identification as a Herschel services user (you have to be a registered user to be able to submit proposals!). Once this information is filled in, click 'OK' on this window and the submission process will start.

If the submission is successful an acknowledge window will appear with the message 'Your proposal was successfully submitted'. The proposal information (username and id assigned by the HSC to your proposal) will appear on the bottom of the Proposal Submission Tool window. However, this is not the final step in the process. Some time later, an e-mail message sent by the HSC to the submitter's e-mail address will confirm the successful reception and processing of the proposal at the HSC. Please check your e-mails to make sure that the submission process finalised without any problems. In case a problem is encountered during the processing of your proposal, the notification e-mail message will ask you to get in contact with the HSC Helpdesk.

Proposals must be submitted prior to the deadline. Please plan your submission early in advance to avoid any unexpected problem in the last minute.

If you have submitted an observing proposal, but have noticed that there are errors or parts of it which need to be revised or updated, there is no need to submit a 'new' proposal. You (or your co-users) can update the proposal by using the options 'Retrieve proposal from HSC' and 'Update proposal at HSC' under the 'Submit' menu of the 'Proposal Submission Tool' window's toolbar. After entering your username and password you can retrieve, update and re-submit your proposals (or those from your co-users) as many times as needed before the deadline.

Chapter 7. Proposal evaluation and selection

The proposals received by the submission deadline at the Herschel Science Centre (HSC) will be organised into four broad science topical areas based on the choice of 'science category' made by the proposer on the proposal coversheet. These Phase 1 proposals will then be made available to the Herschel Observing Time Allocation Committee (HOTAC) for evaluation.

The HOTAC will consist of eight Panels plus the HOTAC Chair, two Panels each representing the four science topical areas as follows:

- Cosmology
- Galaxies/AGNs
- Interstellar Medium/Star Formation & Solar System
- Stars & Stellar Evolution

By having broad science topics and parallel Panels per topic the HOTAC will be able to minimise potential institutional, professional and personal conflicts of interest. All members of the HOTAC Panels will have access to all the proposals electronically using the Herschel Proposal Handling System (PHS) tool.

The HOTAC will evaluate and recommend proposals for execution based on the following criteria:

- Science excellence and relevance of the proposed observations
- Uniqueness/need of Herschel observations to achieve the scientific goals proposed
- Technical merit/feasibility and robustness of the proposed observations
- Convincing plans for the data reduction and analysis
- Archival value and products to be delivered ('large' proposals only)
- Consortium strengths and track records of individuals
- Outreach plan

During this process the HSC will assist HOTAC in the technical evaluation of the proposals, in particular regarding feasibility and duplication issues. After a period of individual study and grading of the proposals, the HOTAC members will hold a formal meeting (to be held on 11-15 October 2010), where they will formulate a consolidated recommendation regarding which proposals be awarded observing time and how much. The ESA Director of Science and Robotic Exploration will receive the HOTAC recommendations and take the final decision.

The PI's of all proposals will be informed by electronic mail of the results of the proposal evaluation process. These results, as well as the comments made by the HOTAC during the meeting, will also be made available to the users through the Herschel PHS web pages where they (and their co-users) will be able to see the status of their proposals and AORs at any moment during the mission (submitted/accepted/rejected/scheduled/ executed/etc). Acceptance of a proposal may be conditional to e.g. modification/reduction of targets and/or observing modes in Phase 2. It has to be noted here that -for operational reasons- no guarantees can be given that any particular AOR will, in fact, be executed, although every attempt will be made to complete all observations requests in accepted proposals.

The list of accepted proposals will be announced by the HSC through the web together with the overall statistics on the response and the results of the call. The information to be made public will contain only the following items:

- Principal Investigator
- Proposal title
- Abstract
- List of Reserved Observations associated to the proposal (as explained in the next section)

The remainder of the approved proposals, and the entirety of the proposals not selected, shall remain confidential to the extent allowed by the review process.

Chapter 8. Phase 2 data entry and reserved observations

The principal investigators of accepted proposals will be invited to Phase 2 of proposal preparation. Note that Phase 2 took place in the first two weeks of May 2010 for the GT1 proposers and will take place in November 2010 for OT1 proposers.

The purpose of Phase 2 is to finalise the proposed observations to committed observations. As already mentioned, change of targets or observing modes will in principle not be allowed, unless they were included in the original proposal as backups. Otherwise, only changes to the observation parameters of AORs already submitted in Phase 1 will be accepted.

The above rules are not applicable to those proposals where the acceptance by HOTAC was conditional to changes to the observations as they were submitted in Phase 1 or when technical problems were identified by the HSC which require observing mode changes to solve them. In this case, the required changes must be implemented in this Phase 2 and the HSC will ensure that they are consistent with the recommendations made.

The end result of Phase 2 is the list of committed observations which will also form the basis of the Reserved Observations list, which may not be repeated by proposers in further calls. Each call for proposals will be accompanied by a major update of the Reserved Observations List, where the new AORs will be added. While the OT1 call is open, no major changes will be permitted in the Reserved Observations List.

Chapter 9. Post-call modifications

Procedures are established to allow for these modifications if proposers consider there is a need to modify and refine approved observations after the call has been closed. They intend to allow some flexibility if the changes are oriented to maximise the scientific return of the mission. However, they will be restricted to the minimum, reviewed and approved by the HSC Community Support Group and requested through Helpdesk.

The modifications made shall not alter the scientific content or intent of the original AOR and must be such that the programme stays within the originally allocated observing time. Major modifications will need to be reviewed and approved by the Project Scientist, in consultation with the HOTAC, if necessary.

In cases where changes of the expected/verified in-flight performance of a given instrument or observing mode will result in seriously degraded scientific results for a given proposal (or a subset of proposals), the HOTAC may be consulted to evaluate the new observing conditions and take necessary actions.

Chapter 10. Further calls for proposals

This is the first in-flight AO. The second and final in-flight AO is foreseen to take place in approximately a year's time. At that point it is expected to have a more accurate estimate of the mission lifetime.

Like all previous AOs, the final AO will have two parts: GT2 and OT2. There is very little GT still unallocated. The amount of time to be offered in OT2 will depend on the predicted mission lifetime and the need of observations for efficient scheduling.

Chapter 11. Data products and proprietary rights

Generic Herschel data product levels are defined as following:

- Level-0 data products: Raw telemetry data as measured by the instrument, minimally manipulated and ingested into the mission data base/archive. Typically, readings are in binary units versus detector pixel number.
- Level-1 data products: Detector readouts calibrated and converted to physical units, in principle instrument and observatory independent. It is expected that level-1 data processing can be performed without human intervention.
- Level-2 data products: Further processed level-1 data to such a level that scientific analysis can be performed. For optimal results many of the processing steps involved to generate level-2 data may require human intervention, based both on instrument understanding as well as understanding of the scientific aims of the observation. These data products are at a publishable quality level and should be suitable for virtual observatory access.
- Level-3 data products: These are the publishable science products where level-2 data products are used as input. These are products not only from the specific instrument, but are usually combined with theoretical models, other observations, laboratory data, catalogues, etc. Their formats should be virtual observatory compatible and these data products should be suitable for virtual observatory access.

Herschel data products (from Level 0 to Level 2) are systematically generated by the Herschel Data Processing pipeline and made available to users through the [Herschel Science Archive](#) immediately after the pipeline processing is completed, typically 1-2 days after an observation has been executed. Following the completion of some basic quality checks, something which may take from a few additional days to weeks, depending on the circumstances, notification e-mails are sent to the data owners that can then be informed about any quality issue affecting their observations.

All observations made after the first year of the routine phase will have a proprietary period of 6 months, after which the observation will become public. The proprietary time applies to each observation individually, counted from the day when the data are made available to the initial data owner. However, a scheme will be put in place whereby the Herschel Project Scientist and the HOTAC Chair in consultation can grant additional proprietary time to certain large programmes, in order to prevent the release of improperly or inhomogeneously calibrated or processed data. Note that data resulting from routine calibration observations will generally enter the public domain immediately after they are processed unless duplicating a science observation.

Chapter 12. Special information for US-based investigators

Investigators at U.S. institutions that are a principal or co-investigator on a proposal submitted to ESA in response to the Herschel OT1 AO are eligible to submit a proposal for NASA Data Analysis (DA) funding to the NASA Herschel Science Center (NHSC). Eligible OT1 investigators must respond to the NHSC call for proposals if they expect NASA funding for their investigation.

The NASA Data Analysis Call for Proposals is available online only, through the NHSC website at <https://nhscsci.ipac.caltech.edu/sc/index.php/Proposals>. All DA proposals must be submitted electronically to the NHSC by August 2, 2010, 5:00 pm (Pacific Daylight Time).