

HERSCHEL OBSERVATORY

Observing with Herschel: practical issues

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http://herschel.esac.esa.int



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Herschel as an observatory

- Herschel will be operated as an observatory-type facility (like ISO)
- Designed to provide routine astronomical observations for a period of at least 3 years after the initial mission phases
- Available to the entire astronomical community: roughly 2/3 of the observing time will be 'Open Time'
- Through a standard competitive proposal procedure
- To some extent Herschel will be its own pathfinder quick reaction times needed
- Observing strategy must be adapted to take this into account (Herschel will be breaking new ground!)





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Distribution of observing time

- Total available observing time in 3 years is: 19,776 hours

 schedulable science time (21 hours/day x 365 days x 3)
 14% (~ 1 day/week) for calibration / engineering
 observations
- Herschel observing time divided into Guaranteed Time (GT) and Open Time (OT)
- 32% (1/3) is for GT (6,328 hours)
- 68% (2/3) is for OT (13,448 hours) a maximum of 4% of it can be allocated as Discretionary Time





Distribution of Guaranteed Time

- Principal Investigator (PI) consortia: each own 30% of the GT (1,898 hours each)
- The Herschel Science Centre (HSC) owns 7% of the GT (443 hours)
- Mission Scientists (MSs) own 0.6% of the GT (38 hours each)
- The Herschel Optical System Scientist (HOSS) owns
 another 38 hours
- PIs are required to spend a minimum of 50% of their GT on 'Key Programmes' (KPs)
- ~40% of OT suggested to be spent on OT KPs





The KP concept (I)



- A mechanism to ensure that 'unusually' large, homogeneous, 'survey-type' programmes can be proposed, selected and scheduled early enough during the mission to allow follow-up studies with Herschel before the end of the mission
- To be defined as a KP an observing program must:
 - Exploit the unique capabilities of Herschel to address (an) important scientific issue(s) in a comprehensive manner
 - Require a large amount of observing time (> 100 h) to be used in a uniform and coherent fashion
 - Produce a resulting well characterised dataset of high archival value





The KP concept (II)



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- It also involves some commitments... (these should be a key criterion in the selection process)
 - Data generated by these observations must be reduced in a timely fashion (to allow follow-up proposals)
 - Resulting data products (at a 'publishable' level) and tools developed to produce them must be made public through the HSC at the end of the proprietary period
- The data products will allow for early science exploitation by the community
- The software tools can be later incorporated or adapted for use as part of the standard HSC data processing software for public release





Initial Herschel AO

- Initial Herschel Announcement of Opportunity is the Call for observing time for Key Programmes
- Both for Guaranteed Time (GT) and Open Time (OT) Key Programmes, but divided into two parts
- In the first round Key Programmes (KPs) for the GT holders are solicited
- After closing the call for the GT holders, a scientific and technical evaluation of the proposed observations is conducted, and a list of reserved observations will be generated and published
- In a second round, the solicitation of OT observing proposals will be announced, open for all members of the astronomical community



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AO schedule

1 February 2007: AO for Key Programmes 4 April 2007: Submission deadline for GT KPs 5 July 2007: Announcement of GT KP proposals and Reserved Observations 25 October 2007: Submission deadline for OT KPs 28 February 2008: Announcement of accepted OT KP proposals and observations





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Docs and tools

- Together with the AO, the following documents will be made available
 - Policies and procedures
 - Herschel Observers' Manual
 - PACS Observers' Manual
 - SPIRE Observers' Manual
 - HIFI Observers' Manual
 - HSpot Users' Guide
- ...plus the Herschel Observation Planning Tool (HSpot); (joint ESA/NASA development) adapted from Spitzer SPOT







- Proposals must be submitted using this tool
- Planning a Herschel observation involves:
 - Entry of target ids and coordinates (through standard name resolvers)
 - Links to Herschel pre-defined observing modes via Astronomical Observing Templates (AOTs)
 - Definition of instrument parameters results in an Astronomical Observing Request (AORs)
- AORs are the primary units of Herschel observing
- HSpot allows you to design, plan, and optimise an observation, and to determine how much time will be required to execute it







H/W and S/W requirements

- Written in JAVA language
 - JAVA 1.5 required
- Operating System configurations supported
 - UNIX: Solaris 2.8
 - Windows: NT, ME, 2000, XP
 - Linux: RedHat 8.0, 9.0; Fedora Core
 - Mac: OS 10.4
- H/W configurations supporting HSpot
 - Sun Workstations: Sun Ultra 5 with 256 MB RAM
 - Windows PC (2000, NT, XP): Pentium 3 processor with
 256 MB RAM
 - Linux PC: Pentium 2 processor with 256 MB RAM
 - Mac PC: G4 processor with 256 MB RAM
- In short: HSpot will run on almost any computer!!





Installing and starting HSpot

- HSpot will soon be available to download from the HSC web site
- Easy installation via an installer script
- Starts with a double-click on the .exe file in Windows or Mac installations
- A README file with instructions is provided for UNIX/Linux users
- The 'automatic update' feature from the Options Menu allows the client side of HSpot to update itself if it detects that a new version is available at the HSC server.
- Internet connection needed to establish communication between client and server (e.g. for estimation of observing times or to access images/catalogues)



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HSpot Interface and Menus

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The proposal lifecycle

- Proposals must be submitted using the HSpot tool
 - A 'header' info (title, proposers, abstract, proposal type, science category and total observing time requested)
 - The scientific and technical rationale as a separate PDF file
 - The observations as prepared with HSpot (just examples can be provided in Phase 1)
- Response to the call for proposals is a two-step process
- *Phase 1* is needed for every proposal while *Phase 2* is only applicable to accepted proposals
- Between the AO and the deadline for the proposal submission the HSC will provide support and answers to questions through the Herschel Helpdesk







- Science case, should:
 - show how the proposed observations match the KP concept
 - give an explanation why the science objectives cannot be met using other facilities or methods
 - refer to past and/or complementary observations available or needed
 - provide an outline description of proposed observations
- Technical implementation, should:
 - describe proposed observing modes and justification to use them
 - provide observing time estimates according to the estimators incorporated in HSpot
 - define special requirements or constraints (overheads are then charged)
 - include a plan for data product generation, validation and delivery





Phase 1



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- Impact of different sensitivities on the program
 - Based on scientific arguments
- Science exploitation
 - Baseline plans for data exploitation by the KP consortium
 - Foreseen use and value of the archived data in the long-term
- Description of archival data products and tools, should
 - Specify what they propose to provide and the benefits to the community
- Outreach plan
- The consortium
 - Summary of staff and other resources that will be committed to the program including short CVs of proposers





Proposal evaluation

- The Herschel Observing Time Allocation Committee (HOTAC) will evaluate and recommend proposals for execution
 - Composed of 4 dual panel structures each dealing with a wide science research area
 - The HSC will assist HOTAC in the technical evaluation of the proposals
- The ESA Director of Science will ultimately receive the recommendations from HOTAC and decide on which proposals will be accepted for execution
- The PIs of all proposals will be contacted by e-mail of the results
- Acceptance of a proposal may be conditional to e.g.
 modifications/reduction of targets and/or observing modes









- Pls of accepted proposals will be invited to Phase 2 of proposal preparation
- To finalise the proposed observations to committed observations
- In general only minor changes allowed (no change of targets or observing modes unless new modes become available between Phase 1 and 2)
- The end result of Phase 2 is the list of committed observations which will also form the basis of the 'reserved observations list'
- Duplicate observations may not be proposed in further calls for proposals







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Post-call modifications

- It is anticipated that before the launch the observing modes will be refined and improved
- Successful proposers will be allowed to modify their programmes every time an improvement is made available
- If they are not important, changes will be entered only once the in-orbit performance is known, before the routine observations are started
- Further call for proposals are envisaged, at least two rounds, each with their GT and OT parts, that will be announced in due time (linked to in-orbit knowledge)





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Data products/proprietary rights

- Data products
 - Level 0: raw telemetry data as measured by the instrument, minimally manipulated
 - Level 1: Detector readouts calibrated and converted in physical
 - Level 1: Detector readouts calibrated and converted in physical units, without human intervention Level 2: further processed data products at a level that scientific analysis can be performed; may require human interaction in some processing steps - Level 2: further processed data products at a level that scientific
 - Level 3: publishable science products (KP deliverables; at least improved Level 2 products expected)
- Proprietary rights (applies to each observation)
 - 12 months for all observations made in the first year of the routine phase
 - 6 months for all observations made later
 - Additional proprietary time can be granted to certain large programmes, in order to prevent the release of improperly or inhomogeneously calibrated or processed data





Community support at ESAC

- The Herschel Science Centre (HSC) will be based at ESAC (NHSC at IPAC for US proposers)
- The HSC is the interface to the community at large, responsible for all 'observatory' aspects of the mission:
 - to perform overall science coordination and scientific mission planning stratregy, taking guidance from the Science Team
 - To issue calls for observing time proposals, and the handling of the proposals
 - To set up and support an HOTAC for time allocation and proposal rating
 - To provide general community support throughout all mission phases, acting as single-point input (requests, proposals), output (information, data, software) interface and 'central web-based helpdesk'
 - To coordinate 'cross-calibration' between Herschel instruments, and between Herschel and other facilities
 - To give support to ESA PR and science communication activities



Next workshop at ESTEC

- Herschel Open Time Key Program Workshop
 ESTEC, Noordwijk,
 20-21 February 2007
- First announcement & on-line registration available
- SOC: Herschel Science Team
- LOC: Herschel Science Centre



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Herschel Open Time Key Program Workshop

Fernie: 20-21 February 2007, ESTEC, Normburgh, The Netherlands Information: http://www.resil.com/hertschef/

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