

Herschel Key Project Data Products: Draft Guidelines for Proposers
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1. Introduction

The Herschel Science management Plan stipulates that Key Project data should be reduced in a timely fashion, and that the resulting data products, and the tools developed to produce them, be made public. A demonstration of the ability and a commitment to perform the necessary data reduction, and to make available the appropriate data products, is to be required for Key Project proposals, and will be a key criterion in the approval of Key Projects by the HOTAC.

This is a very preliminary document outlining the Herschel Science Team's current thinking on guidelines to Key Programme proposers concerning provision of data products and tools. It has no official status, and it is possible that different or additional guidelines and requirements may be defined. This note is only to be used as an indication of what the general philosophy will be, so that Key Project proposal writers can start to think now about the kind of data products that may be appropriate for their programmes.

2. Key Projects

Definition of Key Projects from SMP.

3. Rationale for Key Project data products

It is envisaged that the quality of Herschel data will be progressively enhanced during and after the mission, through the development of better data acquisition, data-processing, and improved calibration. Since the Key Project data products must be produced at an early stage in this process, it is understood that the data products will subsequently be improved upon and superseded.

Besides fulfilling their scientific goals, Key Projects must provide data products which will:

- (i) allow for early science exploitation by the community, based on the data products themselves;
- (ii) provide the community with information usable as the basis of follow-up proposals for Herschel observing time during the mission, in response to AO Cycle-2.

(Note: According to the SMP, AO Cycle 2 is timed at launch + 18 months, with a response at launch + 21 months. So with a proprietary period of 1 year, the KP data products will actually be coming out too late for

AO Cycle 2. This issue will need to be addressed in refining the Observing Programme milestones).

It is also required that KP consortia, on a best-efforts basis, provide (to the HSC) software tools that they have developed in the course of the project, that could be usefully incorporated into or adapted for use in standard HSC software for public release.

4. Requirements

The starting point will be the standard data products that will be delivered to all observers by the HSC. (*Note: these must therefore be fully defined so that proposers can assess what else will be necessary and beneficial*).

The nature and scope of the data products and software will vary from one programme to another, and will depend on the resources available to the KP team. It will be up to the applicants to specify in detail what they propose to provide and the benefits to the community, which will be taken into account by the HOTAC in assessing the proposals.

4.1 Data products

The following requirements will apply to the delivery of the data products:

- The data product release will be by ingestion of the products into the HSC database. Standard electronic file format(s) will be used, to be mutually agreed with the HSC, in order to allow import by users into standard analysis tools.
- Accompanying explanatory documentation shall be provided to assist users in accessing, understanding and utilising the data products, and describing all calibration assumptions and methods and key steps and processes. A high standard of clarity will be important to make the products easily intelligible and usable.
- The data and documentation shall be kept up to date in the course of the data release, and release versions shall be specified (*Note: guidelines are needed on update frequency*).
- Compliance with the final guidelines will be monitored by the Herschel Science Centre (HSC) in consultation with a Herschel Users Committee (TBC).

As examples, the following could be considered as illustrations (not as necessary or sufficient):

- Photometric data
 - Programmes involving photometry of many point or compact sources:
 - Catalogue giving derived flux densities in observed bands, astrometric positions, and their uncertainties, comments
 - Programmes involving small maps:
 - Deconvolved map data as surface brightness with statistical uncertainties and astrometric data.
 - Derived temperature or density maps
 - Programmes involving large maps:
 - Extragalactic deep surveys:
 - Map data as above
 - Point/compact source catalogue giving for each extracted source, flux densities, effective wavelengths, astrometric position, and their uncertainties, comments
 - Galactic surveys:
 - Map data as above
 - Information on point sources, extended sources, characterisation of faint extended emission as appropriate
- Spectroscopic data
 - Identifications of unambiguously detected spectral lines
 - Line strength estimates of unambiguously detected lines, with uncertainties
 - Fitted line profiles

- Velocity channel maps
- Calibrated SEDs (SPIRE spectrophotometry)

4.2 Software and processing tools

In developing software for their own data-analysis purposes, Key Project teams are likely to employ a variety of coding languages, styles, levels of commenting and documentation, and platforms. The requirement for software delivery is therefore to provide the relevant code accompanied by clear documentation explaining and describing the assumptions, parameters, and algorithmic steps implemented in such a way that someone else could reproduce the results.

It is also expected that in many cases software will be developed in response to the actual characteristics of the data as learned after launch, and that Key Project teams will also develop and use some software which is not relevant or of potential use to the HSC. The KP team is expected to liaise with the HSC to deciding whether or not a particular tools are appropriate for delivery.

4.3 Outreach

Key Project teams will be expected to produce material suitable for use in PR activities aimed at the general public, the press, and schools.