



# HIRES Processing



## Overview

HIRES employs the Maximum Correlation Method (MCM) (H.H. Aumann, J.W. Fowler and M. Melnyk, 1990, *AJ*, 99,1674) to construct (resolution-enhanced) coadded images. HIRES images may be requested from IPAC using the e-mail based [data request system](#).

There are some rules of thumb for [choosing good HIRES targets](#). Often examination of the results of a HIRES request will suggest that the data would benefit from re-processing with slightly different [processing options](#) set. In this case, a new HIRES request for the revised processing can be submitted. Options which are not explicitly mentioned in the request form can be written in as "Special Instructions".

HIRES is a three-step process:

1. A program called SNIPSCAN is used to retrieve the raw survey data. The IRAS raw scan data are known as CRDD (Calibrated, Reconstructed Detector Data) and the full set of survey CRDD is stored in a FITS table format merged with the pointing (boresight) information. The collection of the raw data in FITS table format is known as the [Level 1 Archive](#). A program called AOCRDD is used in place of SNIPSCAN to retrieve raw AO (Additional Observation or pointed mode) data. AOs are described briefly under [IRAS spacecraft and mission strategy](#).
2. A program called [LAUNDR](#) is used to clean up the CRDD.
3. A program called [YORIC](#) applies the MCM algorithm to the LAUNDR'd data. For HIRES, YORIC is iterated, progressively reconstructing a better model of the sky. In default processing YORIC is iterated 20 times.

As of March 31, 1993, HIRES is AC calibrated. The IRAS detectors exhibited dwell-time dependent responsivity changes, especially at 12  $\mu\text{m}$ . This is the [IRAS data feature](#) known as the "AC/DC effect". Previous IRAS image products have been calibrated on the DC scale, which is correct for structures on spatial scales greater than 30'. The AC scale gives flux densities commensurate with the Point Source Catalog (PSC2) for point sources.

## HIRES Processing Defaults

The current defaults were chosen to provide the best performance (highest resolution, freedom from artifacts) for the majority of targets. **They may not be the best choice for any given specific target!**

- The image size is 1 degree by 1 degree.
- The pixel size is 15".
- All four bands are processed.
- The data are de-stripped with detector baseline removal and flux bias is applied.
- All three HCONs of survey data are coadded. No AOs are included.
- No paper plots are generated.
- The default tape format is a tar-format Exabyte.
- The beam sample maps use a regular grid of 10 Jy sources on a flat background.
- All types of ancillary maps are produced.
- The algorithm is iterated 20 times, with maps produced at the 1st, 5th, 10th and 20th iterations.

Most of the defaults can be changed using various [processing options](#) which appear explicitly in the request form, or which may be added using the "Special Processing" field.

## HIRES Output

There are several diagnostic map types available from HIRES in addition to the surface brightness map. These ancillary maps are essential to the interpretation of the HIRES results. However, you can request that only some of the ancillary maps be produced.

The available maps and naming conventions are:

- surface brightness (*img\_name\_b#\_iter*)
- coverage (*cvg\_name\_b#*)
- photometric noise (*phn\_name\_b#\_iter*)
- correction factor variance (*cfv\_name\_b#\_iter*)
- HIRES'd beam sample maps (*img\_name\_bem\_b#\_iter*)
- simulator input "spike" plus background model for beam sample maps (*bem\_name\_b#\_last-iter*)
- detector track maps (*det\_name\_b#*)

The following set of ASCII files is also produced:

- beam width report for last iteration (*name\_bem\_b#\_fwhm.txt*)

In the names above:

- "name" is the field name you supply
- "#" is the band number (1, 2, 3, and 4 for 12, 25, 60, and 100  $\mu\text{m}$  respectively)
- "iter" is the iteration number

Note: The default processing thus produces **76 maps** for *each* field!

See the [examples](#) for more information and detailed descriptions of the HIRES output.

## Artifacts in HIRES

HIRES is an excellent amplifier of the peculiarities of the [IRAS data](#), in particular, you should be familiar with the AC/DC effect and point source tails.

HIRES images may suffer from any of a number of artifacts inconsistent with the actual appearance of the sky. Users should be aware of the common [artifacts](#).

## HIRES Interpretation

The [HIRES usage notes](#) give some insight into interpretation of HIRES results and possible re-processing you may wish to consider. Achieved resolution, mosaicking and the use of AOs are among the topics discussed.

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