



SUBJECT: Standard Metadata Names for Herschel Data Processing

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1 General Notes

The "IA standard names" are the ones that should be used in all DP s/w at all times. These are independent of FITS and other formats, and do not inherit their limitations. They are grouped here by FITS analogy for convenience. While certain FITS keywords refer to a *file*, the equivalent IA names do not necessarily – they could equally refer to a product or dataset in an interactive session. Where “file” is mentioned below, it can equally be in this context.

All integer types are given as long, as this is all that is currently supported by the dataset package. There is no obvious need for other types. Similarly, double is used exclusively in place of float.

2 FITS Standard keywords

These are the FITS standard or commonly used keywords, with the exception of the astrometry keywords, which are treated separately in the following section.

IA standard name	Type	FITS equivalent	Description
author	String	AUTHOR	author of the data
creator	String	CREATOR	the name of the software task that created file
startDate	Date	DATE-OBS	start date of observation or applicability of file
creationDate	Date	DATE	date of file creation
equinox	String	EQUINOX	equinox of celestial coordinate system
instrument	String	INSTRUME	instrument name (eg SPIRE)
object	String	OBJECT	name of observed object
observer	String	OBSERVER	name of observer
telescope	String	TELESCOP	name of telescope (eg Herschel)

Notes:

1. Don't use epoch, the FITS standard deprecates it in favour of equinox.
2. There is a HEARSARC PROGRAM keyword synonymous with CREATOR.
3. There is an HEASARC keyword OBJNAME defined as “IAU name of observed object”.

3 FITS Astrometry Keywords

These astrometry keywords (with the exception of the CD ones) are also standard FITS keywords:

IA standard name	Type	FITS equivalent	Description
cdelt1	Double	CDELTA1	pixel size in axis 1 (degrees)
cdelt2	Double	CDELTA2	pixel size in axis 2 (degrees)
crpix1	Double	CRPIX1	reference pixel of axis 1
crpix2	Double	CRPIX2	reference pixel of axis 2
ctype1	String	CTYPE1	type of coordinate axis eg RA---TAN
ctype2	String	CTYPE2	type of coordinate axis eg DEC---TAN
crota2	Double	CROTA2	rotation angle (degrees)
crval1	Double	CRVAL1	axis 1 coordinate at tangency
crval2	Double	CRVAL2	axis 2 coordinate at tangency
cd_1_1	Double	CD_1_1	element of CD matrix



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cd_1_2	Double	CD_1_2	element of CD matrix
cd_2_1	Double	CD_2_1	element of CD matrix
cd_2_2	Double	CD_2_2	element of CD matrix

Notes:

1. CRVAL1/CRVAL2 represent the world coordinates at the point of tangency. Therefore if CTYPE1/CTYPE2 represent the gnomonic projection in celestial coordinates, then they are equivalent to RA/DEC.
2. The CD matrix is an alternative expression of the cdelt/crota2 transformation.

4 HEASARC FITS Keywords

These are (some of the) HEASARC standard keywords, ie the full HEASARC list is not here, just the ones identified for Herschel. Note that the names given here are not always the same as the ones currently defined by the Herschel IO/FITS package, in which case they indicate a proposal to change them.

IA standard name	Type	FITS equivalent	Description
aperture	String	APERTURE	name of field of view aperture
dec	Double	DEC_PNT	actual declination of pointing
decNominal	Double	DEC_NOM	nominal (requested) declination of pointing
decObject	Double	DEC_OBJ	declination of target object
detector	String	DETNAM	name of detector within an instrument
endDate	Date	DATE-END	end date of observation or applicability of file
fileName	String	FILENAME	name of file
filter	String	FILTER	name of filter used
filterN	String	FILTERn	names of filters used
observationMode	String	OBS_MODE	observing mode name eg RASTER/POINTING
ra	Double	RA_PNT	actual RA of pointing
raNominal	Double	RA_NOM	nominal (requested) RA of pointing
raObject	Double	RA_OBJ	RA of target object

Notes:

1. BV suggests virtualAperture = APERTURE, but this seems less general.
2. BV suggests camera = DETNAM, meaning camera/detector array. It's not necessarily either of those though. Possible examples for SPIRE could be PLW for an array or C5 for a specific detector. Should array/detector have different keywords?
3. The PACS URD gives RA/DEC keywords as nominal pointings. Actual pointings are expected to be used most, so typing of those is minimised for IA. The HEASARC keywords define each type explicitly.

5 Herschel Standard Keywords

These should be Herschel standard. This list should be regarded as a start rather than a complete set. The names can be reviewed.

IA standard name	Type	FITS equivalent	Description
aot	String	AOT	AOT name



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bbid	Long	BBID	32-bit building block id
bbfulltype	Long	BBFTYPE	16-bit building block type
bbtype	Long	BBTYPE	14-bit building block type
bbcount	Long	BBCOUNT	16-bit building block count
instrumentModel	String	MODELNAM	name of instrument model (eg CQM)
nodding	Boolean	NODDING	s/c nodding mode
obsid	Long	OBSID	32-bit observation id
origin	String	ORIGIN	site that created product
proposal	String	PROPOSAL	proposal name
raster	Boolean	RASTER	s/c raster mode
roll	Double	ROLL	spacecraft roll angle
scanning	Boolean	SCANNING	s/c scanning mode
timeZone	String	TIMEZONE	time zone of dates (normally UTC)

Notes:

1. instrumentModel is currently called modelName in IO package, but might be ambiguous.
2. There is an Heasarc keyword OBS_ID, but OBSID is already in use by SPIRE.
3. roll might be equal in practice to crota2, but this is not guaranteed.
4. Keywords describing the position in a raster or scan will also be needed. As I am not sure exactly how these manoeuvres will be performed (eg in which axes) I have not attempted to name them.

6 Potential Common Keywords

These keywords are already in use by SPIRE and might have common usage. Note that some of them only apply on the ground and not in space!

IA standard name	Type	FITS equivalent	Description
airtemp	Double	AIRTEMP	air temperature
bbtemp	Double	BBTEMP	black body temperature
codeVersion	String	CODE_VER	name of data acquisition program
fileOrigin	String	FILEORIG	point of reduction step eg ORIGINAL/AVERAGE
filetype	String	FILETYPE	type of measurement eg NOISE
humidity	Double	HUMIDITY	humidity
pressure	Double	PRESSURE	air pressure
samples	Long	NSAMPLES	number of samples
sampleFrequency	Double	ROTFREQU	frequency of samples
sampleTime	Double	SAMPTIME	time interval between samples
waveform	String	WAVEFORM	waveform of bias AC voltage eg square

Notes:

1. codeVersion refers to a data acquisition program and not the writer of the file cf. creator. The name is probably confusing.
2. fileOrigin could easily be confused with origin.