

# ALMA Science

Knowledgebase > General > What MS naming conventions does ALMA follow?

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## What MS naming conventions does ALMA follow?

Edward Starr - 2026-03-13 - General

### Introduction

As the ALMA data reduction process has matured, the naming conventions of MS files have been updated several times and new cases were added. Expanded pipeline capabilities such as self-calibration have also changed the final contents of these files. This article aims to help users differentiate between the MS files they obtain, understand their contents, and clarify which is best to use for imaging.

For details on archived data products, see here:

<https://almascience.org/processing/qa2-data-products> (Section 5.6)

For details on Pipeline processing, see here:

<https://almascience.org/processing/science-pipeline>

For help restoring calibrated data from the Archive or ARC-specific services, see here:

<https://help.almascience.org/kb/articles/how-do-i-obtain-a-file-of-calibrated-visibility-measurement-set-for-almadata>

#### Note

Modes NOT covered here include manual SD reduction, solar observing, VLBI, and phased array. There may be other exceptions as well. Contact the helpdesk for clarification on specific data sets.

### Data columns

Every MS has at least a DATA column. A CORRECTED column may or may not exist depending on if the MS has been split off from a prior MS or if new calibrations have been applied. Certain CASA tasks operate on a specific data column by default or it can be specified. In particular:

- [applycal](#): applies the specified calibration tables to the DATA column and writes the output to the CORRECTED column
- [split/mstransform](#): by default splits out the CORRECTED column of the input MS, placing it in the DATA column of the output MS.
- [tclean](#): creates images by reading from the CORRECTED column, if present, and will fall back to the DATA column if not.

To override default behaviors, the data column can be specified with the parameter `datacolumn=""`, with the arguments 'data', 'corrected', 'model', or 'all'.

#### Note

The following tables describe the contents of each MS **after** the data have been calibrated. This usually means running `scriptForPI.py` to restore the QA2 calibration, but may also include other methods, such as restoring directly with `casa_piperestorescript.py`, or running the calibration from scratch with the provided manual calibration scripts (`uid*.ms.scriptForCalibration.py`) or pipeline script (`casa_pipescript.py`).

## Pipeline calibrated IF data

MS	DATA column	CORRECTED column	Fields	Spectral Windows	ALMA Cycles	Notes
uid*.ms	raw	calibrated	all	all	all	(1)
uid*target.ms	calibrated	continuum subtracted	science only	science only	4-8	
uid*targets.ms	calibrated	selfcal (2)	science only	science only	9+	
uid*targets_line.ms	calibrated & continuum subtracted	selfcal (2)	science only	science only	9+	Restored by running <code>scriptForPI.py</code> with the option <code>DOCONTSUB=True</code> (3) (4)
uid*.ms.split.cal	calibrated	<empty> (5)	all	science only	all	This is not a pipeline product, but can be created by running <code>scriptForPI.py</code> with the option <code>DOSPLIT=True</code> (3) (6)

(1) If `casa_piperestorescript.py` is run on uncalibrated data it restores the calibration stages of the pipeline only. Imaging stages which include splitting out the science target, continuum subtraction, and self-calibration are not run.

(2) The pipeline implemented self-calibration in Cycle 10. Self-calibrated data will be present per-target field only if self-calibration was successful for that field. If no self-calibration was applied for any field, the CORRECTED column will not be created at all.

(3)

<https://help.almascience.org/kb/articles/what-global-variables-are-available-in-scriptforpi-py>

(4) `DOCONTSUB=True` is automatically triggered if `scriptForPI.py` detects that the data was successfully self-calibrated during QA2, and the self-cal solutions will be applied.

(5) The CORRECTED column will not be present for this MS directly after restoring the data with `scriptForPI`. However, running an imaging script that includes a successful self-calibration step would initialize the CORRECTED column and place the self-calibrated data there.

(6) `DOSPLIT=True` is automatically triggered if `scriptForPI.py` detects that manual imaging

was performed at QA2.

## Manually calibrated IF data

MS	DATA column	CORRECTED column	Fields	Spectral Windows	ALMA Cycles	Notes
uid*.ms	raw	<i>a priori</i> calibrations (7)	all	all	all	initial product
uid*.ms.split	<i>a priori</i> calibrations (7)	calibrated	all	science only	all	intermediate product for fully manual imaging OR final product if using pipeline imaging tasks (8)
uid*.ms.split.cal	calibrated	<empty> (5)	all	science only	all	final product for fully manual imaging (9)
concat_s#.ms (10)	calibrated	pol calibrated	all	science only	all	full polarization only: uid*.ms.split.cal concatenated per session
concat_s#.ms.cal (10)	pol calibrated	<empty>	all (11)	science only	all	full polarization only: uid*.ms.split.cal concatenated per session

(7) *a priori* calibration includes WVR, system temperature, and antenna positions. Standard calibrations including bandpass calibration, gain calibration, and flux scaling have not yet been performed.

(8) Pipeline imaging tasks require a corrected column and \*.ms.flagversions file, so uid\*.ms.split.cal cannot be used.

(9) scriptForPI.py will restore this by default for all manually calibrated data.

(10) # indicates session number (1, 2, 3, etc).

(11) Older versions may not include all calibrators or the check source.

## Pipeline calibrated SD data

MS	DATA column	CORRECTED column	Fields	Spectral Windows	ALMA Cycles	Notes
uid*.ms	raw	calibrated (12)	all	all	all	initial product
uid*.ms.atmcor.atmtype# (13)	ATM corrected	<empty>	science only	science only	8+	intermediate product
uid*.ms.atmcor.atmtype#_bl (13)	baseline subtracted	<empty>	science only	science only	8+	final product (used for imaging)

uid*.ms_bl	baseline subtracted (14)	<empty>	science only	science only	7 and earlier	final product (used for imaging)
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(12) includes Tsys, sky ON-OFF subtraction, and Jy/K factor scaling, applied to the science targets and science spws only

(13) type may be 1, 2, 3, or 4

(14) Cycle 7 and prior do not include ATM correction

## Concatenated data

Note

The following contain several EBs of a given MOUS concatenated into a single MS to prepare for manual imaging. This may have been performed by scripts such as scriptForImagingPrep.py or scriptForImaging.py. This practice is no longer standard.

<b>MS</b>	<b>DATA column</b>	<b>CORRECTED column</b>	<b>Fields</b>	<b>Spectral Windows</b>	<b>ALMA Cycles</b>	<b>Notes</b>
calibrated_final.ms (15)	calibrated	<empty> (5)	science only	science only	Common through Cycle 3 (16)	

(15) Some other products you may come across include calibrated.ms, calibrated\_source.ms, calibrated\_final\_cont.ms, calibrated\_final\_line.ms, etc. Ask the helpdesk for clarification on specific data sets.

(16) The IF pipeline began science target imaging in Cycle 4. Manual imaging has tapered off since then.