

EPS-SG MWS Level 1B Auxiliary Data Specification (ADS)

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Change Record

Version	Date of Version as on profile	Docu ment Change Request (DCR) Number if applicable	Description of changes
V1 Draft	1 July 2014	N/A	First Draft version
V1	12 December 2014	N/A	Version submitted for Internal Preliminary Design Review
V1A	03 March 2015	N/A	V1A Draft – Modified according to Reviewer comments from Internal Preliminary Design Review
V1B	09 March 2015	N/A	V1B – The cover page was not updated correctly in the earlier version.
V1C	08 September 2015	N/A	V1C – Removed DEM from Auxiliary data Updated Table 1.
V1D	15 December 2015	EUM-EPSSG-DCR-131	Version for Payload Acquisition and Data Processing ITT. Changes: Updated following comments from Processing Specifications Review. Updated Table 1 according to GADS. Updated information on Land Sea Mask DEM is now part of the auxiliary data and information on the DEM is added. Reorganised variables in the calibration data among the subgroups, for eg., all instrument temperature related auxiliary data necessary for calibration are moved from calibration subgroup to hk_telemetry group. Units and dimensions of some variables are corrected in this version.
V2A	02 December 2016	EPSSG_D CR_482	Version for PDAP Kickoff Document updated to align with updated GADS. Summary tables for all auxiliary data updated, mainly related to giving internal filenames, sizes of the internal files, Source and Members. The overall summary table is also updated.

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Version	Date of Version as on profile	Docume nt Change Request (DCR) Number if applicable	Description of changes
			Auxiliary Data: Context file (AUX_COF) updated with contents. Auxiliary Data: Calibration parameters (AUX_CCDB) updated. The Global attributes contents are aligned to be the same as in manifest. New auxiliary data that are necessary for the PGS are added. Some of these new variables are added as part of the existing groups and some are in new subgroups. Sub group hk_telemetry renamed to instrument temperature and subgroup rfi corrections changed to pulsed interference. NcML files for Calibration parameters data updated and NcML file for Context data newly added.
V3A	24 January 2018	EPSSG_D CR_851	Section 1.6 Updated acronym list. Section 3.5 Updated the description and generation frequency of MWS L1 Context data. The contents are also updated to be in line with the PGS. Section 3.6 Updated the contents of calibration parameters data and context data. Some new variables are added to be in line with the PGS. Some variables are moved across groups. In addition to this, some variable names were changed so that they are same as in PGS. In Section 3.6.4.10.2 some scanning properties variables for warm view are added. Appendix A Updated NcML files for calibration parameters auxiliary data (AUX_CCDB) and context auxiliary data (AUX_COF).
V3B	26 September 2018		Section 3.6: Few more variables added to the Calibration Parameters file. Number of FOVs, PRTs and HPRs given according to information from Instrument CDR. Widespread Minor Changes to nomenclature.

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Version	Date of Version as on profile	Docume nt Change Request (DCR) Number if applicable	Description of changes
V3C	21 February 2019	EPSSG_D CR_1106	Sections 3.3 and 3.4 updated with new LSM and DEM descriptions. Section 3.6: Addition of a second configuration file containing INR-related parameters.
V3D	02 October 2019	EPSSG_D CR_1420	Section 3.3.4.2: fixed Table 3. Section 3.4.4.2: fixed Table 6. Section 3.5.4.2.2: Fixed scaling factors and a new variable added to Table 10. Section 3.5.2: filename end validity clarified. Section 3.6.2: filename GR identifier set to be ‘_’ instead of ‘G’. Section 3.6.5.2: Two new global dimension defined in Table 14. Section 3.6.5.4.2: new dimension for variables channel_bandwidths, channel_pol_primary_secondary in Table 16. Section 3.6.5.6.2: introduced new variable thermistor_minimum_acceptable_readings, removed variable n_scan_nedt and minor changes to the variable long names in Table 19. Section 3.6.5.7.2: array variable mws_attitude_correction split into three new single variables, removed scaling factor from moon_radius in Table 20. Section 3.6.5.8.2: shorter name for the second variable in Table 21. Section 3.6.5.9.2: slightly modified names to several variables in Table 23. Section 3.6.5.11.2: slightly modified name to a variable (antenna_pattern_version) in Table 25. Section 3.6.5.12: A new dimension (n_resol) defined in new Table 26 and minor change to variable name and type in Table 27. Section 3.6.5.13.2: Added two variables, fixed values for scaling factors, added ‘add_offset’ attributes, removed ‘valid_min’, ‘valid_max’, ‘missing_value’ attributes in Table 28. Throughout the document: minor changes to several variable long names, removed the ‘units’ attribute from any dimensionless variable. Updated document signature table.

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Version	Date of Version as on profile	Docume nt Change Request (DCR) Number if applicable	Description of changes
V4A	04 October 2021	EPSSG_D CR_2083	Sections 3.5.2 and 3.6.2: reworded AUX file description. Section 3.5.4.2.2: revamped name, longname, units of <i>time_context_data</i>, changed valid min/max and scaling of <i>radiance_rr_context</i>, added variables <i>nonlinearity_correction_context</i>, <i>postdetection_amplifier_gain_context</i>, <i>calibration_gain_context</i>. Section 3.6.5.3: updated longname of <i>selected_coldview_pos</i> and <i>nominal_54_ghz_side</i>. Section 3.6.4.2: changed type of CFI group variables <i>maximum_gap_OSV</i>, <i>maximum_gap_quaternions</i>, <i>maximum_gap_OSV_boundaries</i>, <i>maximum_gap_quaternions_boundaries</i>, <i>requested_OSV_step</i>. Section 3.6.5.2: moved in <i>radiometric_constants</i> group the global dimensions <i>n_band</i>, <i>n_pol</i>. Updated longname of <i>selected_coldview_pos</i>. Section 3.6.5.4: added group dimensions <i>n_band</i>, <i>n_pol</i>, <i>n_coef_freq_shift</i>, changed <i>channel_bandwidths</i>, <i>channel_pol_primary_secondary</i> dimensions, update longnames of <i>channel_central_freq</i>, <i>channel_central_wavenum</i>, <i>first_channel_band_correction</i>, <i>second_channel_band_correction</i>. Section 3.6.5.5: swapped dimensions of variable <i>fovs_angle_nominal_coldview</i>. Section 3.6.5.6: merged variables from removed <i>pulsed_interferences</i> group; added variables <i>warmview_correction_radiance_redundant</i>, <i>nedt_integration_time_scaling</i>, <i>moon_contamination_algorithm_flag</i> changed to unsigned; fix few variable long names. Added dimension to <i>weighting_coefs_time_count_calibcount</i>, <i>weighting_coefs_time_count_nedt</i>. Changed name of <i>wght_therm_temp_instr</i>. Table 19 filled with range values. Section 3.6.5.7: merged dimension <i>n_resol</i> and variable <i>lsmdem_search_resol</i> from removed group <i>lsm_dem</i>. Type of <i>moon_radius</i> changed to float. Section 3.6.5.8: added dimension <i>n_coef_prt_count_to_res</i>. Added variables <i>ccdb_instrument_model</i>, <i>n_thermometer_external</i>,

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Version	Date of Version as on profile	Docu ment Change Request (DCR) Number if applicable	Description of changes
			<i>n_instrument_current</i>, <i>n_instrument_voltage</i>, <i>prt_counts_to_resistance_conv_coef</i>. Deleted variables <i>n_primary_power_switch</i>, <i>n_secondary_power_switch</i>, <i>n_local_oscillators</i>, <i>nbyte_motorpos_pcc_fix</i>, <i>n_motorcurrent_channels_selected</i>. Renamed variable <i>n_motor_current_channels</i>. Moved here variables <i>prt_minimum_reasonable_temperature</i>, <i>prt_maximum_reasonable_temperature</i> from calibration group. Changed longname and units of <i>thermistor_counts_to_resistance_conv_coef</i>. Table 23 filled with values. Section 3.6.5.9.2: Changed <i>scan time start to first fov coldview</i> from scalar to array of <i>n_pos_cold</i> elements. Section 3.6.5.11.2: improved longname of <i>maxdif_radiance_rr</i>, changed scaling factor of <i>radiance_rr_default</i> and <i>maxdif_radiance_rr</i>, added variable <i>calibration_gain_default</i>. Appendix B: updated list of TBC. Changes to fix inconsistencies of order of variable dimensions mentioned in AR/NCR ID: EUM/EPSSG/AR/570. First and second variable dimension swapped for the following variables: <i>channel_bandwidths</i>, <i>channel_pol_primary_secondary</i>, <i>coldview_correction_radiance</i>, <i>prt_resistance_to_temp_conv_coef_prime</i>, <i>prt_resistance_to_temp_conv_coef_redundant</i>.
V5	20 March 2024	EPSSG_D CR_2676	- Removed global attributes <i>members</i> and <i>fileSize</i> from Table 2, Table 5, Table 8, Table 11, Table 13. - Section 2.3: fixed and extended Table 1. - Sections 3.3.2, 3.4.2, 3.6.2: clarified upper/lowercase in version number. - Section 3.5.4.2.2: fixed valid max of <i>radiance_rr_context</i> in Table 10. - Section 3.6.5.3: renamed <i>nominal_54_ghz_side</i> - Section 3.6.5.4.2: added <i>channel_band_freq</i>, renamed <i>channel_pol_primary_secondary</i> - Section 3.6.5.6.2: renamed <i>warmview_correction_radiance_prime</i> and <i>warmview_correction_radiance_redundant</i>

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Version	Date of Version as on profile	Docu ment Change Request (DCR) Number if applicable	Description of changes
			• Section 3.6.5.7.1: added dimension <i>n_coef_tb_moon</i>. • Section 3.6.5.7.2: added variable <i>tb_moon_coef</i>. • Section 3.6.5.8.2: renamed <i>precision_resistances_prime</i>, <i>precision_resistances_redundant</i>, <i>prt_resistance_to_temp_conv_coef_prime</i>, <i>prt_resistance_to_temp_conv_coef_redundant</i>, <i>prt_reference_mean_resistance_prime</i>, <i>prt_reference_mean_resistance_redundant</i>, <i>prt_weighting_coef_prime</i>, <i>prt_weighting_coef_redundant</i>, <i>nonlinearity_correction_coef</i>. Added <i>nonlinearity_correction_coef_side_b</i>. Removed <i>prt_reference_std_resistance_prime</i>, <i>prt_reference_std_resistance_redundant</i>, <i>instrument_reference_temperatures_backup</i>. • New Section 3.7. • Appendix A extended. Updated document signature table.
		EPSSG_D CR_yyyy	

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1 INTRODUCTION

1.1 Purpose and Scope

This document is the Auxiliary Data Specification for the EPS-SG MWS Level 1B Auxiliary Data sets used or generated by the EPS-SG Ground Segment. It aims at specifying the detailed format of the MWS Level 1B auxiliary data in agreement with the format and naming conventions set out in the Generic Auxiliary Data Specification [GADS] applicable to all EPS-SG Auxiliary Data.

Auxiliary data covers several data categories used at the Ground Segment, either of static or dynamic nature, from sources either internal or external to the ground segment. They are required to process, calibrate or improve the payload science data. This does not include on-board ancillary data received from the Satellite. Categories of data considered as Auxiliary data include: Geophysical corrections, Exogenous Data, External Calibration Data and Observation & Forecast Data.

1.2 Relation to Other Documents

The EPS-SG MWS Level 1B Auxiliary Data Specification [MWS-L1B-ADS] is a System document in the EPS-SG System Specification tree. It is applicable to the [SRD], [OGSRD], MWS L1B Product Generation Specification [MWS-L1B-PGS] and EPS-SG System and Ground Segment documents including ICDs/IRDs wishing to convey information about the MWS L1B auxiliary data format and content.

This document is derived from and compliant to [GADS] for generic auxiliary data format, naming conventions and metadata applicable to all EPS-SG Auxiliary data files.

1.3 Applicable Documents

ID	Title	Reference
[GADS]	EPS-SG Generic Auxiliary Data Specification (GADS)	EUM/LEO-EPSSG/SPE/13/718291
[MCSD]	EPS-SG Mission Conventions and Standards Document	EUM/LEO-EPSSG/STD/14/745221
[DEV]	Development Logic for EPS-SG L0-L1-L2 Processing Specifications	EUM/LEO-EPSSG/TEN/14/763159
[HQ-BAS]	EPS-SG Data and Products Generation, Archiving and Dissemination Baseline at EUMETSAT HQ	EUM/LEO-EPSSG/SPE/15/819557

1.4 Reference Documents

ID	Title	Reference
[SRD]	EPS-SG System Requirements Document	EUM/LEO-EPSSG/SPE/13/735903
[OGSRD]	EPS-SG Overall Ground Segment Requirements Document	EUM/LEO-EPSSG/REQ/13/725156
[MWS-L1B-PGS]	EPS-SG Microwave Sounder (MWS) Level 1B Product Generation Specification	EUM/LEO-EPSSG/SPE/14/777476
[MWS-L1B-ATBD]	EPS-SG Microwave Sounder (MWS) Level 1B Product Algorithm Theoretical Basis Document (ATBD)	EUM/LEO-EPSSG/SPE/14/737100
[MWS-ICCDB]	MWS Characterisation and Calibration Data Base Specification	MOS-SP-ADSP-MWS-1000003419
[MWS-IODS]	MWS GPP/IDS Input Output Data Specification (IODS)	MOS-IRD-ADSP-MWS-1000109872
[MWS-DPM]	TBW	TBW

1.5 Acronyms

The definition of conventions, terms and abbreviations applicable to the EPS-SG programme can be found in [MCSD]. Abbreviations specific to this document are listed in the following table.

Acronym	Definition
ACE	Altimeter Corrected Elevations
ADF	Auxiliary Data File
ADS	Auxiliary Data Specification - A document describing the detailed format and content of auxiliary data required in input and generated in output by one or more Product Generation Functions. Applicable to L1B/L2 Product Generation Functions.
AOI	Area Of Interest
ASCII	American Standard Code for Information Interchange
Auxiliary Data	A Generic term covering several data categories used at the Ground Segment, either of static or dynamic nature, from sources either internal or external to the ground segment. They are required to process, calibrate or improve the payload science data. This does not include on-board ancillary data received from the Satellite. Categories of data considered as Auxiliary data include: Geophysical corrections, Exogenous Data, External Calibration Data and Observation & Forecast Data.
DTED	Digital Terrain Elevation Data
GADS	Generic Auxiliary Data Specification - A document describing generic formatting and naming conventions applicable to all auxiliary data required by and generated by Product Generation Functions (PGFs) in the EPS-SG Ground Segment. It is applicable to each specific Auxiliary Data Specification. It also describes the detailed format and content of auxiliary data which are common to several Product Generation Functions.
GRIB	Gridded Binary
GS	Ground Segment
LO	Local Oscillator
LSM	Land Sea Mask
LST	Land Surface Type
MAD	Median Absolute Deviation
NWP	Numerical Weather Forecast
NNP	Non Nominal Parameters
PDP	Payload Data Processing
PGF	Product Generation Function - An EPS-SG Ground Segment function responsible for generation of one or more mission product types in native format. It may also generate auxiliary data.
PRT	Platinum Resistance Thermometer
RFI	Radio Frequency Interface

Acronym	Definition
SIP	Submission Information Package
SRTM	Shuttle Radar Topography Mission
UTC	Universal Time Coordinate
XML	Extensible Markup Language
XSD	XML Schema Definition according to W3C XSD

1.6 Conventions and Terminology

Naming and formatting conventions used in this document are the ones of EPS-SG Auxiliary data files as described in [GADS]. Generic terms and definitions applicable to the EPS-SG Programme can be found in [MCSD].

1.6.1 Meaning of Table Headings

Element Name	Description
File/Description	Description of the auxiliary data
Filename	File name of the auxiliary data (following naming convention described in [GADS]).
Auxiliary Data ID	Identifier of the auxiliary data (selected from the generic list specified in the [GADS]).
Format	GS format of the auxiliary data (as per [GADS]).
Format of internal files	Format of files included in the auxiliary data.
Filename of internal files	Name of files.
Auxiliary Data Size	Estimated size of the auxiliary data (MByte).
Generation Frequency	Generation frequency (e.g. 1 per day). This might be an approximate guess.
Validity	Validity time of the Auxiliary data files.
Internal/External	An auxiliary data is classified as internal or external, depending on the source (or provider) is internal or external to the Ground Segment.
Static/Dynamic	Auxiliary data file can have static or dynamic nature, depending on the generation frequency. Auxiliary data is considered static if it has an update frequency typically greater than once per month.
Source	Source or provider of the auxiliary data.
netCDF Tables	
Variable Name	The name of NetCDF variable.
Attribute Name	The name of NetCDF attribute (see also: http://www.unidata.ucar.edu/software/netcdf/docs/netcdf/Attribute-Conventions.html) Attributes may be global or related to a group instead of a variable; in this case they must appear before dimensions.
Dimension Name	The name of NetCDF dimension.
Description	Description of the element; for a variable the description must coincide with its “long_name” attribute.
Range or value	Range or value of variables, or value of dimensions or attributes.
Unit	Unit type of variables or attributes.
Data Type or Type	Type of variables or attributes as defined in [GPFS], not used for dimensions.
Dimension	Dimensions of the variables or attributes, in the same order than storage and with one dimension per line. Dimensions must be always defined before variables.

1.7 Document structure

Section Number	Title	Content
1	Introduction	The Scope and Purpose of the ADS document is described in this section, along with Open Issues, Assumptions, Applicable and Reference documents.
2	EPS-SG MWS Level 1B Auxiliary Data Overview	A high-level overview on the MWS Level 1B Auxiliary is presented in this section. The Auxiliary Data List and the Naming convention are also specified here.
3	EPS-SG MWS Level 1B Auxiliary Data Detailed Format	The format of each MWS Level 1B Auxiliary Data (detailed description of the data format, including original file format where applicable) is described in this section.
APP A	XML Description of EPS-SG MWS Level 1B Auxiliary Data	The .xml and .xsd schemas for the MWS Level 1B Auxiliary Data Files are provided in this section.

2 EPS-SG MWS LEVEL 1B AUXILIARY DATA OVERVIEW

This section gives an overview of the MWS L1B Auxiliary data generated by the EPS-SG Ground Segment at EUMETSAT Headquarters.

2.1 Overall Structure of EPS-SG Auxiliary Data

All auxiliary data in the EPS-SG Ground Segment will comply with the same generic format and naming convention as specified in the [GADS].

An auxiliary data file that is SIP formatted (i.e. ADF is packaged in a folder) consists of a folder which contains the following data file components:

- Manifest file;
- Data File(s).

The Manifest file is an XML file that contains metadata information on the properties of the auxiliary data and data files that are part of the auxiliary data file. The XML header including the metadata is described in [GADS].

The Auxiliary Data File is a file that contains the specific information required for data processing. The exact content, format and number of data file depend on the type of auxiliary data file and on the type of information that it contains. The data files might be eventually organized in a *Data Folder* within the SIP package.

In the following sections, the physical composition and content of each auxiliary data file is specified for the MWS instrument.

2.2 Naming Convention

The naming convention of EPS-SG Auxiliary data files complies with the naming convention specified in [GADS].

Example of Auxiliary data file name (for illustrative purpose only):

**SGA1_MWS_1B_AUX_LSM_<G>__S20091102000000Z_
E99990101000000Z_G20091102000000Z_CALV_OPE_OPER.SIP**

This is a L1B Auxiliary Data file for the MWS mission onboard EPS-SG/A1 satellite that gives information on the land-sea mask. This file is valid between 2 November 2009 00:00:00 hours and 01 January 9999 00:00:00 hours and was created by the CALV on 2 November 2009 00:00:00 hours in the Ground Segment operational environment for routine operations.

2.3 MWS Level 1B Auxiliary Data List

The table below provides the full list of MWS Level 1B Auxiliary Data Files used within the ground segment. The sizes are provided in MB.

EPS-SG MWS Level 1B Auxiliary Data Specification (ADS)
Table 1: EPS-SG MWS L1B Auxiliary Data List

File	G/R	I/E	S/D	Source	Generation Frequency	Format of data file(s)	Filename of data file(s)	Auxiliary Data Size (MByte)	Required For Local Mission (Y/N)	Auxiliary Data ID (ADF-ID)
MWS Land Sea Mask File	N/A	E	S	CALV	Infrequently	netCDF-4	MWS_L1B_AUX_LSM_vxyxy.nc	~25 MB	Y	MWS_1B_AUX_LSM_
MWS Digital Elevation Model	N/A	E	S	CALV	Infrequently	netCDF-4	MWS_L1B_AUX_DEM_vxyxy.nc	~25 MB	Y	MWS_1B_AUX_DEM_
MWS L1B Configuration and Calibration Parameters	N/A	I	S	CALV	Infrequently	netCDF-4	MWS_L1B_AUX_CCDB_vxyxy.nc	~1 MB	Y	MWS_1B_AUX_CCDB
MWS L1B Processor Configuration Files	N/A	I	S	LP__	Infrequently	XML	MWS_L1B_AUX_CNFO_vxyxy.xml MWS_L1B_AUX_CNF1_vxyxy.xml MWS_L1B_AUX_CNFC_vxyxy.xml MWS_L1B_AUX_CNFP_vxyxy.xml	~1 MB	Y	MWS_1B_AUX_CNF_
MWS L1B Context Data	G/R	I	D	MWS L1B PGF	Per granule	netCDF-4	SGA1_MWS_1B_AUX_COF__G_S 20210101120000Z_E202101011 20300Z_G20210101130000Z _PDP_OPE_OPER.nc	~1 MB	N	MWS_1B_AUX_COF_
Predicted Orbit File	See [GADS]								Y	____AUX_POFD
IERS Bulletin A	See [GADS]								Y	____AUX_IBA_

3 EPS-SG MWS LEVEL 1B AUXILIARY DATA DETAILED FORMAT

This section describes the detailed content of each auxiliary data files listed in Table 1, including the format of the internal files where applicable.

- Predicted Orbit File (____AUX_POFD)
- IERS Bulletin A (____AUX_IBA_)
- MWS Land Sea Mask (MWS_1B_AUX_LSM_)
- MWS Digital Elevation Model (MWS_1B_AUX_DEM_)
- MWS L1B Configuration and Calibration Parameters (MWS_1B_AUX_CCDB)
- MWS L1B Context Data (MWS_1B_AUX_COF_)
- MWS L1B Processor Configuration Files (MWS_1B_AUX_CNF_)

3.1 Predicted Orbit File

Please see [GADS].

3.2 IERS Bulletin A

Please see [GADS].

3.3 MWS Land-Sea Mask

3.3.1 Purpose and Description

This file provides the information on whether the pixel is land, sea or coast.

3.3.2 Auxiliary Data Summary Sheet

Name	MWS Land Sea Mask
Description	Provides information on whether the pixel is above land, sea or coast
Example of Filename	SGA_MWS_1B_AUX_LSM____ S20210101120000Z_XXXXXXXXXXXXXZ_G20210102060000Z _CALV_OPE_OPER.SIP
Spacecraft	SGA_
Auxiliary Data ID (ADF-ID)	MWS_1B_AUX_LSM_
Source	CALV
Members	1
Example of internal filename	MWS_L1B_AUX_LSM_vxxyy.nc Format “vxxyy”, where: • “v” = fixed lowercase “v”, indicating the version number • “xx” = main version number [00-99] • “yy” = minor version number [00-99]
Format of internal file (data file)	NetCDF-4
Auxiliary Data Size (MB)	~25 MB
Generation Frequency	Infrequently
Validity	Entire mission

3.3.3 Format

The physical structure and the file components of the Land Sea Mask file are shown below in Figure 1.

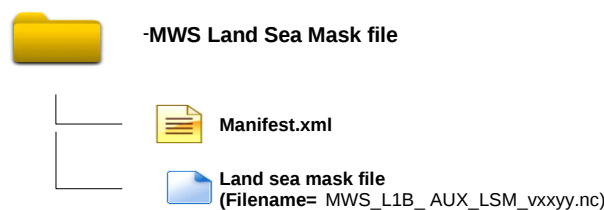


Figure 1: Structure of Land-sea mask File

3.3.4 Format of Data Files

This section describes the detailed format of the internal files of land-sea mask auxiliary file. This is an internal file in NetCDF-4 format.

3.3.4.1 Global Attributes

This section describes the global attributes for the Land-Sea Mask (MWS_1B_AUX_LSM). The global attributes contain the same information as in the summary data sheets and the metadata information in the manifest file.

Attribute Name	Type	Meaning and/or value
fileName	NC_STRING	As specified in the manifest-file
name	NC_STRING	
description	NC_STRING	
satelliteID	NC_STRING	
instrumentID	NC_STRING	
processingLevel	NC_STRING	
adfType	NC_STRING	
GR	NC_STRING	
validityStartDateTime	NC_STRING	
validityEndDateTime	NC_STRING	
generationDateTime	NC_STRING	
source	NC_STRING	
environment	NC_STRING	
class	NC_STRING	
documentReference	NC_STRING	As specified in the manifest-file for this particular Data Object.
fileType	NC_STRING	
format	NC_STRING	
size	NC_UINT	

Table 2: Global Attributes for MWS_1B_AUX_LSM

3.3.4.2 Global Dimensions

This section lists the global dimensions for the MWS_1B_AUX_LSM file.

Dimension Name	Description	Range or Value
n_lat_lsm	Number of LSM latitudes between the poles	
n_gridpoints_lsm	Total number of LSM grid points	

Table 3: Global Dimensions for MWS_1B_AUX_LSM

3.3.4.3 Global Variables

Variables Name	Description	Type	Range or Value	Dimension
land_sea_mask	Global Land Sea Mask (LSM) on the grid: East to West and North to South	NC_FLOAT		n_gridpoints_lsm
<i>long_name</i>	Description of variable	NC_STRING	Global Land Sea Mask (LSM) on the grid: East to West and North to South	
lat1_lsm	Latitudes (North to South) between the poles for the LSM	NC_FLOAT	-90.0,90.0	n_lat_lsm
<i>long_name</i>	Description of variable	NC_STRING	Latitudes (North to South) between the poles for the LSM	
<i>units</i>	Physical units	NC_STRING	degrees	
n_lon_inlat_lsm	Number of longitude points for each latitude circle for the LSM	NC_INT		n_lat_lsm
<i>long_name</i>	Description of variable	NC_STRING	Number of longitude points for each latitude circle for the LSM	
lon1_lsm	First Longitude (East to West) along each latitude circle for the LSM	NC_FLOAT	0.0,360.0	n_lat_lsm
<i>long_name</i>	Description of variable	NC_STRING	First Longitude (East to West) along each latitude circle for the LSM	
<i>units</i>	Physical units	NC_STRING	degrees	

Table 4: Global Variables for MWS_1B_AUX_LSM

3.4 MWS Digital Elevation Model

3.4.1 Purpose and Description

The data file provides information on the terrain elevation at pixel locations.

3.4.2 Auxiliary Data Summary Sheet

Name	MWS Digital Elevation Model
Description	Provides information on the terrain elevation
Example of Filename	SGA_MWS_1B_AUX_DEM____ S20210101120000Z_XXXXXXXXXXXXXZ_G20210102060000Z CALV_OPE_OPER.SIP
Spacecraft	SGA_
Auxiliary Data ID (ADF-ID)	MWS_1B_AUX_DEM_
Source	CALV
Members	1
Example of internal filename	MWS_L1B_AUX_DEM_vxxyy.nc Format “vxxyy”, where: • “v” = fixed lowercase “v”, indicating the version number • “xx” = main version number [00-99] • “yy” = minor version number [00-99]
Format of internal file (data file)	NetCDF-4
Auxiliary Data Size (MB)	~25 MB
Generation Frequency	Infrequently
Validity	Entire mission

3.4.3 Format

The physical structure and the file components of the Digital Elevation Model file are shown below in Figure 2.

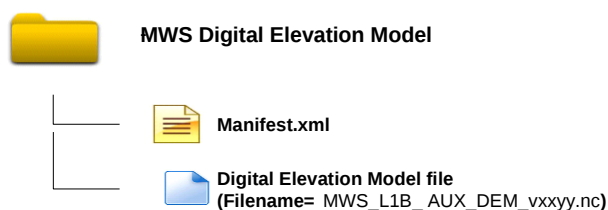


Figure 2- Structure of Digital Elevation Model

3.4.4 Format of Data Files

This section describes the detailed format of the internal files of Digital Elevation Model auxiliary file. This is an internal file in NetCDF-4 format.

3.4.4.1 Global Attributes

This section describes the global attributes for the DEM (MWS_L1B_AUX_DEM). The global attributes contain the same information as in the summary data sheets and the metadata information in the manifest file.

Attribute Name	Type	Meaning and/or value
fileName	NC_STRING	As specified in the manifest-file
name	NC_STRING	
description	NC_STRING	
satelliteID	NC_STRING	
instrumentID	NC_STRING	
processingLevel	NC_STRING	
adfType	NC_STRING	
GR	NC_STRING	
validityStartDateTime	NC_STRING	
validityEndDateTime	NC_STRING	
generationDateTime	NC_STRING	
source	NC_STRING	
environment	NC_STRING	
class	NC_STRING	
documentReference	NC_STRING	As specified in the manifest-file for this particular Data Object.
fileType	NC_STRING	
format	NC_STRING	
size	NC_UINT	

Table 5: Global Attributes for MWS_L1B_AUX_DEM

3.4.4.2 Global Dimensions

This section lists the global dimensions for the MWS_L1B_AUX_DEM file.

Dimension Name	Description	Range or Value
n_lat_dem	Number of DEM latitudes between the poles	
n_gridpoints_dem	Total number of DEM grid points	

Table 6: Global Dimensions for MWS_L1B_AUX_DEM

3.4.4.3 Global Variables

Variables Name	Description	Type	Range or Value	Dimension
digital_elevation_model	Global Digital Elevation Model (DEM) on the grid: East to West and North to South	NC_FLOAT		n_gridpoint s_dem
<i>long_name</i>	Description of variable	NC_STRING	Global Digital Elevation Model (DEM) on the grid: East to West and North to South	
<i>units</i>	Physical units	NC_STRING	m	
lat1_dem	Latitudes (North to South) between the poles for the DEM	NC_FLOAT	-90.0,90.0	n_lat_dem
<i>long_name</i>	Description of variable	NC_STRING	Latitudes (North to South) between the poles for the DEM	
<i>units</i>	Physical units	NC_STRING	degrees	
n_lon_inlat_dem	Number of longitude points for each latitude circle for the DEM	NC_INT		n_lat_dem
<i>long_name</i>	Description of variable	NC_STRING	Number of longitude points for each latitude circle for the DEM	
lon1_dem	First Longitude (East to West) along each latitude circle for the DEM	NC_FLOAT	0.0,360.0	n_lat_dem
<i>long_name</i>	Description of variable	NC_STRING	First Longitude (East to West) along each latitude circle for the DEM	
<i>units</i>	Physical units	NC_STRING	degrees	

Table 7: Global Variables for MWS_L1B_AUX_DEM

3.5 MWS L1B Context Data

3.5.1 Purpose and Description

A Context Data file is generated during the L1B processing of every MWS L0 data granule. This file contains calibration coefficients and timestamp information and serves as input to subsequent granules. The information stored in this file can be used for processing a subsequent data granule if nominal conditions are not met in such granule.

3.5.2 Auxiliary Data Summary Sheet

Name	MWS L1B Context Data
Description	Contains the calibration coefficients and time stamps saved during L1B product generation of the latest granule
Example of Filename	SGA1_MWS_1B_AUX_COF__G_ S20210101120000Z_E20210101120300Z_G20210101130000Z_PD P_OPE_OPER.SIP
Spacecraft	SGA[1-3]__
Auxiliary Data ID (ADF-ID)	MWS_1B_AUX_COF__
Source	PDP (Payload Data Processing component)
Members	1
Example of internal filename	SGA1_MWS_1B_AUX_COF__G_ S20210101120000Z_E20210101120300Z_G20210101130000Z_PD P_OPE_OPER.nc (identical to the SIP-filename, but with .nc extension)
Format of internal file(s)	netCDF-4
Auxiliary Data Size (MB)	~1 MB
Generation Frequency	1 Per granule
Validity	Start validity = Sensing time (UTC) of context data; End validity = Start validity plus tmax_context_valid (stored in CCDB); Validity duration = tmax_context_valid.

3.5.3 Format

The physical structure and the components of the Context Data file are shown in Figure 3 below.

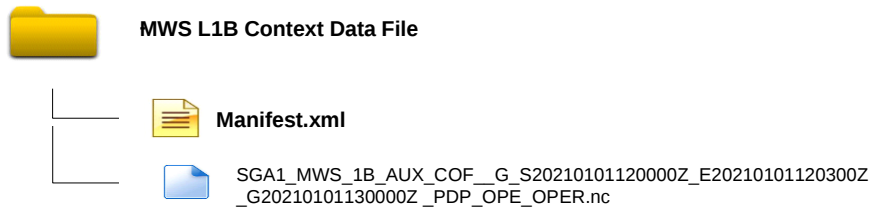


Figure 3- Structure of Context File

3.5.4 Format of Internal Data Files

The context data is stored in NetCDF-4 format.

3.5.4.1 Global Attributes

Attribute Name	Type	Meaning and/or value
fileName	NC_STRING	As specified in the manifest-file
name	NC_STRING	
description	NC_STRING	
satelliteID	NC_STRING	
instrumentID	NC_STRING	
processingLevel	NC_STRING	
adfType	NC_STRING	
GR	NC_STRING	
validityStartDateTime	NC_STRING	
validityEndDateTime	NC_STRING	
generationDateTime	NC_STRING	
source	NC_STRING	
environment	NC_STRING	
class	NC_STRING	
documentReference	NC_STRING	As specified in the manifest-file for this particular Data Object.
fileType	NC_STRING	
format	NC_STRING	
size	NC_UINT	

Table 8: Global Attributes for MWS_1B_AUX_COF data

3.5.4.2 Group Name: context_data

3.5.4.2.1 context_data: Dimensions

Dimension Name	Description	Range or Value
n_channels	Number of channels	24

Table 9: Dimension for context data group of MWS_1B_AUX_COF data

3.5.4.2.2 context_data: Variables

Variables Name	Description	Type	Range or Value	Dimension
time_context_data_utc	Context Data time stamp in UTC	NC_DOUBLE		n_channels
long_name	Description of variable	NC_STRING	Context Data time stamp in UTC	
units	Physical units	NC_STRING	seconds since 2020-01-01 00:00:00.000	
calib_coef_context_zero_order	Context Data calibration coefficient: zero order term (a_0)	NC_INT	from valid_min to valid_max	n_channels
long_name	Description of variable	NC_STRING	Context Data calibration coefficient: zero order term (a_0)	
units	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm	
scale_factor	Scale factor applied	NC_DOUBLE	10 ⁻⁹	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_INT	-2 ³¹ + 1	
valid_max	Valid maximum value	NC_INT	2 ³¹ - 1	
missing_value	missing value	NC_INT	-2 ³¹	
calib_coef_context_first_order	Context Data calibration coefficient: first order term (a_1)	NC_INT	from valid_min to valid_max	n_channels
long_name	Description of variable	NC_STRING	Context Data calibration coefficient: first order term (a_1)	
units	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm counts ⁻¹	
scale_factor	Scale factor applied	NC_DOUBLE	10 ⁻¹³	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_INT	-2 ³¹ + 1	
valid_max	Valid maximum value	NC_INT	2 ³¹ - 1	
missing_value	missing value	NC_INT	-2 ³¹	
calib_coef_context_second_order	Context Data calibration coefficient: second order term (a_2)	NC_INT	from valid_min to valid_max	n_channels
long_name	Description of variable	NC_STRING	Context Data calibration coefficient: second order term (a_2)	

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Variables Name	Description	Type	Range or Value	Dimension
<i>units</i>	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm counts ⁻²	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10 ⁻¹⁹	
<i>add_offset</i>	<i>Offset applied</i>	NC_DOUBLE	0.0	
<i>valid_min</i>	Valid minimum value	NC_INT	-2 ³¹ + 1	
<i>valid_max</i>	Valid maximum value	NC_INT	2 ³¹ - 1	
<i>missing_value</i>	missing value	NC_INT	-2 ³¹	
radiance_rr_context	Context Data reflector radiance	NC_INT	from valid_min to valid_max	n_channels
<i>long_name</i>	Description of variable	NC_STRING	Context Data reflector radiance	
<i>units</i>	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10 ⁻⁸	
<i>add_offset</i>	<i>Offset applied</i>	NC_DOUBLE	0.0	
<i>valid_min</i>	Valid minimum value	NC_INT	0	
<i>valid_max</i>	Valid maximum value	NC_INT	20000000	
<i>missing_value</i>	missing value	NC_INT	-2 ³¹	
nonlinearity_correction_context	Context Data nonlinear correction term	NC_INT	from valid_min to valid_max	n_channels
<i>long_name</i>	Description of variable	NC_STRING	Context Data nonlinear correction term	
<i>units</i>	Physical units	NC_STRING	counts ⁻¹	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10 ⁻¹⁵	
<i>add_offset</i>	<i>Offset applied</i>	NC_DOUBLE	0.0	
<i>valid_min</i>	Valid minimum value	NC_INT	-2 ³¹ + 1	
<i>valid_max</i>	Valid maximum value	NC_INT	2 ³¹ - 1	
<i>missing_value</i>	missing value	NC_INT	-2 ³¹	
postdetection_amplifier_gain_context	Context Data post detection amplifier gain	NC_INT	from valid_min to valid_max	n_channels
<i>long_name</i>	Description of variable	NC_STRING	Context Data post detection amplifier gain	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10 ⁻⁸	
<i>add_offset</i>	<i>Offset applied</i>	NC_DOUBLE	0.0	
<i>valid_min</i>	Valid minimum value	NC_INT	1	

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Variables Name	Description	Type	Range or Value	Dimension
<i>valid_max</i>	Valid maximum value	NC_INT	$2^{31} - 1$	
<i>missing_value</i>	missing value	NC_INT	-2^{31}	
calibration_gain_context	Context Data calibration gain	NC_UINT	valid_min to valid_max	n_channels
<i>long_name</i>	Description of variable	NC_STRING	Context Data calibration gain	
<i>units</i>	Physical units	NC_STRING	counts K ⁻¹	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-6}	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	
<i>valid_min</i>	Valid minimum value	NC_UINT	0	
<i>valid_max</i>	Valid maximum value	NC_UINT	$2^{32} - 2$	
<i>missing_value</i>	Missing value	NC_UINT	$2^{32} - 1$	

Table 10: Variables for context data group of MWS_1B_AUX_COF data

3.6 MWS L1B Configuration and Calibration Parameters

3.6.1 Purpose and Description

This auxiliary data file contains all information that is necessary for the MWS geolocation and calibration, i.e. the conversion of L0 counts into L1B radiances. These parameters do not change over time, or change very slowly, with timescales comparable to the lifetime of the instrument.

3.6.2 Auxiliary Data Summary Sheet

This section provides a summary of the Configuration and Calibration parameters auxiliary data

Name	MWS L1B Configuration and Calibration Parameters
Description	Contains the auxiliary data necessary for MWS geolocation and calibration
Example of Filename	SGA1_MWS_1B_AUX_CCDB____ S20210101120000Z_XXXXXXXXXXXXXXZ_G20210102060000Z _CALV_OPE_OPER.SIP
Spacecraft	SGA[1-3]
Auxiliary Data ID (ADF-ID)	MWS_1B_AUX_CCDB_
Source	CALV
Members	2
Example of internal filename	MWS_L1B_AUX_CCDB_vxxyy.nc MWS_L1B_AUX_CFI_vxxyy.nc Format “vxxyy”, where: • “v” = fixed lowercase “v”, indicating the version number • “xx” = main version number [00-99] • “yy” = minor version number [00-99]
Format of internal file(s)	netCDF-4
Auxiliary Data Size (MB)	~1 MB
Generation Frequency	Infrequently
Validity	Entire Mission

3.6.3 Format

The physical structure and data file components of the MWS_1B_AUX_CCDB file are shown in Figure 4.

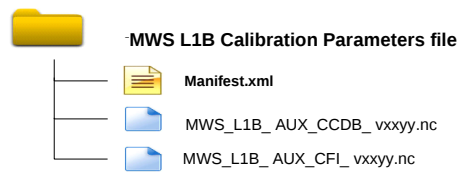


Figure 4- Structure of MWS L1B Configuration and Calibration Parameters

3.6.4 Format of the CFI File

This section describes the detailed format of the internal files of MWS L1B CFI file. This is an internal file in NetCDF-4 format.

3.6.4.1 Global Attributes

This section describes the global attributes for the MWS_1B_AUX_CFI file. The global attributes contain same information as in the summary data sheets, and metadata information in the manifest file.

Attribute Name	Type	Meaning and/or value
fileName	NC_STRING	As specified in the manifest-file
name	NC_STRING	
description	NC_STRING	
satelliteID	NC_STRING	
instrumentID	NC_STRING	
processingLevel	NC_STRING	
adfType	NC_STRING	
GR	NC_STRING	
validityStartDateTime	NC_STRING	
validityEndDateTime	NC_STRING	
generationDateTime	NC_STRING	
source	NC_STRING	
environment	NC_STRING	
class	NC_STRING	
documentReference	NC_STRING	As specified in the manifest-file for this particular Data Object.
fileType	NC_STRING	
format	NC_STRING	
size	NC_UINT	

Table 11: Global Attributes for MWS_1B_AUX_CFI

3.6.4.2 Group Name: CFI

3.6.4.2.1 CFI: Variables

Variables Name	Description	Type	Range or Value	Dimension
satellite_platform_attitude_mode	Satellite platform attitude mode	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Satellite platform attitude mode	
mean_earthsun_distance	Mean Earth-Sun distance (AU)	NC_UINT64		1
<i>long_name</i>	Description of variable	NC_STRING	Mean Earth-Sun distance (AU)	
<i>units</i>	Physical units	NC_STRING	m	
maximum_gap_OSV	The maximum gap that can be accepted for Orbit State Vectors in the NAVATT Level 0 product	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	The maximum gap that can be accepted for Orbit State Vectors in the NAVATT Level 0 product	
<i>units</i>	Physical units	NC_STRING	s	
maximum_gap_quaternions	The maximum gap that can be accepted for Quaternions in the NAVATT Level 0 product	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	The maximum gap that can be accepted for Quaternions in the NAVATT Level 0 product	
<i>units</i>	Physical units	NC_STRING	s	
maximum_gap_OSV_boundaries	The maximum gap that can be accepted for Orbit State Vectors at boundaries in the NAVATT Level 0 product	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	The maximum gap that can be accepted for Orbit State Vectors at boundaries in the NAVATT Level 0 product	
<i>units</i>	Physical units	NC_STRING	s	

Variables Name	Description	Type	Range or Value	Dimension
maximum_gap_quaternions_boundaries	The maximum gap that can be accepted for Quaternions at boundaries in the NAVATT Level 0 product	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	The maximum gap that can be accepted for Quaternions at boundaries in the NAVATT Level 0 product	
<i>units</i>	Physical units	NC_STRING	s	
requested_OSV_step	Threshold to discard OSVs duplicated or too close in time w.r.t. the nominal time step	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Threshold used to discard OSVs that are duplicated or too close in time w.r.t. the nominal time step	
<i>units</i>	Physical units	NC_STRING	s	
requested_quaternion_step	Threshold to discard Quaternions duplicated or too close in time w.r.t. the nominal time step	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Threshold used to discard Quaternions that are duplicated or too close in time w.r.t. the nominal time step	
<i>units</i>	Physical units	NC_STRING	s	

Table 12: Variables for the CFI group of MWS_1B_AUX_CFI

3.6.5 Format of the CCDB File

This section describes the detailed format of the internal files of MWS L1B Calibration Parameters. This is an internal file in NetCDF-4 format.

3.6.5.1 Global Attributes

This section describes the global attributes for the MWS L1B Calibration Parameters (MWS_L1B_AUX_CCDB). The global attributes contain same information as in the summary data sheets, and metadata information in the manifest file.

Attribute Name	Type	Meaning and/or value
fileName	NC_STRING	As specified in the manifest-file
name	NC_STRING	
description	NC_STRING	
satelliteID	NC_STRING	
instrumentID	NC_STRING	
processingLevel	NC_STRING	
adfType	NC_STRING	
GR	NC_STRING	
validityStartDateTime	NC_STRING	
validityEndDateTime	NC_STRING	
generationDateTime	NC_STRING	
source	NC_STRING	
environment	NC_STRING	
class	NC_STRING	
documentReference	NC_STRING	As specified in the manifest-file for this particular Data Object.
fileType	NC_STRING	
format	NC_STRING	
size	NC_UINT	

Table 13: Global Attributes for MWS_1B_AUX_CCDB

3.6.5.2 Global Dimensions

This section describes the global dimensions for the MWS L1B calibration parameters MWS_L1B_AUX_CCDB.

Dimension Name	Description	Range or Value
n_channels	Number of channels	24
n_channels_os	Number of channels with oversampling	2
n_fovs	Number of Earth field of views per scan	95
n_fovs_cal	Number of cold and warm field of views per scan	5
n_pos_cold	Number of cold view positions	3
n_temp_ref_inst	Number of reference instrument temperatures	5-20

Table 14: Global Dimensions for MWS_1B_AUX_CCDB

3.6.5.3 Global Variables

Variables Name	Description	Type	Range or Value	Dimension
selected_coldview_pos	Selected cold view position for calibration	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Selected cold view position for calibration	
nominal_icu_redundancy	ID of nominal ICU redundancy (10 = ICU A , 11 = ICU B)	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	ID of nominal ICU redundancy (10 = ICU A , 11 = ICU B)	

Table 15: Global Variables for MWS_1B_AUX_CCDB

3.6.5.4 Group Name: radiometric_constants

This section describes the structure of the radiometric_constants group of the MWS_1B_AUX_CCDB data.

3.6.5.4.1 radiometric_constants: Dimensions

No dimensions other than the ones described in global variables.

Dimension Name	Description	Range or Value
n_band	Number (maximum) of channel bandwidths	4
n_pol	Number of polarisations	2
n_coef_freq_shift	Number of coefficients used in estimating channel central frequency shift	2-10

Table 16: MWS L1B radiometric_constants group dimensions for MWS_1B_AUX_CCDB auxiliary data

3.6.5.4.2 radiometric_constants: Variables

This section describes the format of the radiometric constants.

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Variables Name	Description	Type	Range or Value	Dimension
speed_of_light	Speed of light in vacuum	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Speed of light in vacuum	
<i>units</i>	Physical units	NC_STRING	m s ⁻¹	
first_rad_const	First radiation constant	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	First radiation constant	
<i>units</i>	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm ⁴	
second_rad_const	Second radiation constant	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Second radiation constant	
<i>units</i>	Physical units	NC_STRING	K cm	
tb_cosmic	Cosmic Background Brightness Temperature	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Cosmic background brightness temperature	
<i>units</i>	Physical units	NC_STRING	K	
channel_central_wavenum	Channel central wavenumber	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Channel central wavenumber	
<i>units</i>	Physical units	NC_STRING	cm ⁻¹	
first_channel_band_correction	Channel first band correction coefficient	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Channel first band correction coefficient	
<i>units</i>	Physical units	NC_STRING	K	
second_channel_band_correction	Channel second band correction coefficient	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Channel second band correction coefficient	
channel_central_frequency	Channel central frequency	NC_FLOAT	23 GHz to 230 GHz	n_channels
<i>long_name</i>	Description of variable	NC_STRING	Channel central frequency	
<i>units</i>	Physical units	NC_STRING	GHz	
channel_bandwidths	Channel bandwidths in MHz	NC_FLOAT	1 MHz to 5000 MHz	n_channels, n_band
<i>long_name</i>	Description of variable	NC_STRING	Bandwidths of MWS channels	

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Variables Name	Description	Type	Range or Value	Dimension
<i>units</i>	Physical units	NC_STRING	MHz	
channel_band_freq_offsets	Channel band frequency offsets	NC_FLOAT		n_channels, n_band
<i>long_name</i>	Description of variable	NC_STRING	Channel band frequency offsets	
<i>units</i>	Physical units	NC_STRING	GHz	
channel_freq_shift_coef	Central-frequency shift coefficients (wrt temperature)	NC_FLOAT		n_channels, n_coef_freq_shift
<i>long_name</i>	Description of variable	NC_STRING	Central-frequency shift coefficients (wrt temperature)	
channel_pol_side_a_side_b	Channel polarisation: 1 = Vertical at Nadir rotating with view angle QV, 2 = Horizontal at Nadir rotating with view angle QH. First column is for side A receiver, second is for side B receiver	NC_SHORT	Nominal Polarization: 1 = Vertical at Nadir rotating with view angle QV, 2 = Horizontal at Nadir rotating with view angle QH	n_channels, n_pol
<i>long_name</i>	Description of variable	NC_STRING	Channel polarisation: 1 = Vertical at Nadir rotating with view angle QV, 2 = Horizontal at Nadir rotating with view angle QH. First column is for side A receiver, second is for side B receiver	

Table 17: MWS L1B Radiometric Constants for MWS_1B_AUX_CCDB auxiliary data

3.6.5.5 Group Name: *antenna_pointing*

This section describes the structure of the *antenna_pointing* group of the MWS_1B_AUX_CCDB data.

3.6.5.5.1 *antenna_pointing*: Dimensions

No dimensions.

3.6.5.5.2 *antenna_pointing*: Variables

This section describes the antenna pointing auxiliary parameters. Colours are used to differentiate variable and attributes: variables are in light blue and attributes in white with name right-aligned.

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Variables Name	Description	Type	Range or Value	Dimension
antpos_convcoef _slope_earthvie w	Slope conversion factor from counts in telemetry to antenna position - Earth view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Slope conversion factor from counts in telemetry to antenna position - Earth view	
<i>units</i>	Physical units	NC_STRING	degrees counts ⁻¹	
antpos_convcoef _intercept_earth view	Intercept conversion factor from counts in telemetry to antenna position – Earth view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Intercept conversion factor from counts in telemetry to antenna position - Earth view	
<i>units</i>	Physical units	NC_STRING	degrees	
antpos_convcoef _slope_warmvie w	Slope conversion factor from counts in telemetry to antenna position – warm target view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Slope conversion factor from counts in telemetry to antenna position - warm target view	
<i>units</i>	Physical units	NC_STRING	degrees counts ⁻¹	
antpos_convcoef _intercept_warm view	Intercept conversion factor from counts in telemetry to antenna position – warm target view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Intercept conversion factor from counts in telemetry to antenna position - warm target view	
<i>units</i>	Physical units	NC_STRING	degrees	
antpos_convcoef _slope_coldview	Slope conversion factor from counts in telemetry to antenna position – cold view	NC_FLOAT		1

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Slope conversion factor from counts in telemetry to antenna position - cold view	
<i>units</i>	Physical units	NC_STRING	degrees counts ⁻¹	
antpos_convcoef_intercept_coldview	Intercept conversion factor from counts in telemetry to antenna position – cold view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Intercept conversion factor from counts in telemetry to antenna position - cold view	
<i>units</i>	Physical units	NC_STRING	degrees	
antpos_allowed_error_coldview	Antenna positional error allowed – cold view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Antenna positional error allowed - cold view	
<i>unit</i>	Physical units	NC_STRING	degrees	
antpos_allowed_error_warmview	Antenna positional error allowed – warm target view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Antenna positional error allowed - warm target view	
<i>unit</i>	Physical units	NC_STRING	degrees	
antpos_allowed_error_earthview	Antenna positional error allowed – Earth view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Antenna positional error allowed - Earth view	
<i>units</i>	Physical units	NC_STRING	degrees	
first_fov_angle_nominal_earthview	Nominal angle of first Earth view FOV	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Nominal angle of first Earth view FOV	
<i>units</i>	Physical units	NC_STRING	degrees	
fovs_angle_nominal_coldview	Nominal angle of cold view FOVs (positions 0,1,2)	NC_FLOAT		n_pos_cold, n_fovs_cal
<i>long_name</i>	Description of variable	NC_STRING	Nominal angle of cold view FOVs (positions 0,1,2)	
<i>units</i>	Physical units	NC_STRING	degrees	
fovs_angle_nominal_warmview	Nominal angle of warm target view FOVs	NC_FLOAT		n_fovs_cal

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Nominal angle of warm target view FOVs	
<i>units</i>	Physical units	NC_STRING	degrees	

Table 18: MWS L1B antenna_pointing group variables for MWS_1B_AUX_CCDB auxiliary data

3.6.5.6 Group Name: calibration

3.6.5.6.1 calibration: Dimensions

Dimension Name	Description	Range or Value
n_therm_temp_rr	Number of thermistors used in model to estimate scanning reflector (RR) temperature	1-10
n_therm_temp_inst	Number of thermistors used in model to estimate instrument temperature	1-10
n_sampletime_prt	Number of samples in time combined for each PRT in estimation of OBCT temperature	4-10
n_sampletime_temp	Number of samples in time combined for each thermistor in estimation of RR and instrument temperatures	1-10
n_sampletime_calib_count	Number of samples in time combined in estimation of calibration counts	4-10
n_sampletime_nedt	Number of samples averaged in estimation of NEDT	4-10

Table 19: MWS L1B calibration group dimensions for MWS_1B_AUX_CCDB auxiliary data

3.6.5.6.2 calibration: Variables

This section describes the format of the calibration auxiliary parameters. Colours are used to differentiate variable and attributes: variables are in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Range or Value	Dimension
moon_contamination_algorithm_flag	Moon contamination correction algorithm (1=on/0=off)	NC_UBYTE	0 or 1	1
<i>long_name</i>	Description of variable	NC_STRING	Moon contamination detection algorithm (1=on/0=off)	
id_therm_rr	ID for each thermistor used in estimating RR temperature	NC_SHORT		n_therm_temp_rr
<i>long_name</i>	Description of variable	NC_STRING	ID for each thermistor used in estimating RR temperature	

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Variables Name	Description	Type	Range or Value	Dimension
wght_therm_temp_rr	Weighting coefficient for each thermistor used in estimating RR temperature	NC_FLOAT		n_therm_temp_rr
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficient for each thermistor used in estimating RR temperature	
temp_offset_rr	Temperature offset used in estimating RR temperature	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Temperature offset used in estimating RR temperature	
<i>units</i>	Physical units	NC_STRING	K	
id_therm_inst	ID for each thermistor used in estimating instrument temperature	NC_SHORT		n_therm_temp_inst
<i>long_name</i>	Description of variable	NC_STRING	ID for each thermistor used in estimating instrument temperature	
wght_therm_temp_inst	Weighting coefficient for each thermistor used in estimating instrument temperature	NC_FLOAT		n_therm_temp_inst
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficient for each thermistor used in estimating instrument temperature	
temp_offset_inst	Temperature offset used in estimating instrument temperature	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Temperature offset used in estimating instrument temperature	
<i>units</i>	Physical units	NC_STRING	K	
limit_to_distance_prttemp_from_median	Limit to distance of each PRT temperature from their median value	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Limit to distance of each PRT temperature from their median value	
<i>units</i>	Physical units	NC_STRING	K	
prt_maximum_allowed_temp_change	Maximum PRT temperature change allowed (before rejecting)	NC_FLOAT		1

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Maximum PRT temperature change allowed (before rejecting)	
<i>units</i>	Physical units	NC_STRING	K	
prt_minimum_acceptable_readings	Minimum number of PRT readings that is acceptable	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Minimum number of PRT readings that is acceptable	
n_scans_fill_bad_temperatures	Number of scan lines to fill in bad PRT or instrument temperatures	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Number of scan lines to fill in bad PRT or instrument temperatures	
thermistor_minimum_acceptable_readings	Minimum number of thermistor readings that is acceptable	NC_SHORT		
<i>long_name</i>	Description of variable	NC_STRING	Minimum number of thermistor readings that is acceptable	
max_instrument_temperature_change_allowed	Maximum instrument temperature change allowed during scan consistency check	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Maximum instrument temperature change allowed during scan consistency check	
<i>units</i>	Physical units	NC_STRING	K	
warmview_minimum_reasonable_counts	Minimum reasonable limit for the warm view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Minimum reasonable limit for the warm view counts	
<i>units</i>	Physical units	NC_STRING	counts	
warmview_maximum_reasonable_counts	Maximum reasonable limit for the warm view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum reasonable limit for the warm view counts	
<i>units</i>	Physical units	NC_STRING	counts	

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Variables Name	Description	Type	Range or Value	Dimension
coldview_minimum_reasonable_counts	Minimum reasonable limit for cold view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Minimum reasonable limit for the coldview counts	
<i>units</i>	Physical units	NC_STRING	counts	
coldview_maximum_reasonable_counts	Maximum reasonable limit for cold view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum reasonable limit for the cold view counts	
<i>units</i>	Physical units	NC_STRING	counts	
earthview_minimum_reasonable_counts	Minimum reasonable limit for Earth view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Minimum reasonable limit for the Earth view counts	
<i>units</i>	Physical units	NC_STRING	counts	
earthview_maximum_reasonable_counts	Maximum reasonable limit for Earth view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum reasonable limit for the Earth view counts	
<i>units</i>	Physical units	NC_STRING	counts	
max_range_warmview_counts	Maximum allowed range for warm view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum allowed range for warm view counts	
<i>units</i>	Physical units	NC_STRING	counts	
max_range_coldview_counts	Maximum allowed range for cold view counts	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum allowed range for cold view counts	
<i>units</i>	Physical units	NC_STRING	counts	
limit_todist_warmview_counts_from_median	Limit to distance of warm view counts from their median	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Limit to distance of warm view counts from their median	
<i>units</i>	Physical units	NC_STRING	counts	

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Variables Name	Description	Type	Range or Value	Dimension
limit_todist_coldview_counts_from_median	Limit to distance of cold view counts from their median	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Limit to distance of cold view counts from their median	
<i>units</i>	Physical units	NC_STRING	counts	
max_acceptable_warmcount_scan_difference	Maximum difference of mean warm counts between current and previous scan allowed (before rejecting)	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum difference of mean warm counts between current and previous scan allowed (before rejecting)	
<i>units</i>	Physical units	NC_STRING	counts	
max_acceptable_coldcount_scan_difference	Maximum difference of mean cold counts between current and previous scan allowed (before rejecting)	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum difference of mean cold counts between current and previous scan allowed (before rejecting)	
<i>units</i>	Physical units	NC_STRING	counts	
min_number_calibration_counts_for_intrascan_average	Minimum number of calibration counts to perform intra scan average	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Minimum number of calibration counts to perform intra scan average	
nmax_scans_reset_check_counts	Maximum number of scan lines before resetting last value	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Maximum number of scan lines before resetting last value	
prt_time_wght	Weighting coefficients for each time sample of each PRT used in estimating OBCT temperature	NC_FLOAT		n_sample_time_prt

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficients for each time sample of each PRT used in estimating OBCT temperature	
therm_rr_time_weight	Weighting coefficients for each time sample of all thermistors used in RR temperature estimation	NC_FLOAT		n_sampletime_temp
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficients for each time sample of all thermistors used in RR temperature estimation	
therm_inst_time_weight	Weighting coefficients for each time sample of all thermistors used in instrument temperature estimation	NC_FLOAT		n_sampletime_temp
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficients for each time sample of all thermistors used in instrument temperature estimation	
weighting_coeffs_time_count_calibration	Weighting coefficients for each time sample of each count used in estimating calibration count	NC_FLOAT		n_channels, n_sampletime_calibration_count
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficients for each time sample of each count used in estimating calibration count	
weighting_coeffs_time_count_nedt	Weighting coefficients for each time sample of each count used in estimating NEDT	NC_FLOAT		n_channels, n_sampletime_nedt

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficients for each time sample of each count used in estimating NEDT	
half_num_scans_average_prt	Half of the number of scan lines to average OBCT temperatures.	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Half of the number of scan lines to average OBCT temperatures	
half_num_scans_average_temp	Half of the number of scan lines to average temperatures.	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Half of the number of scan lines to average temperatures	
half_num_scans_average_counts	Half of the number of scan lines to average counts	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Half of the number of scan lines to average counts	
half_num_scans_average_nedt	Half of the number of scan lines to average counts for NEDT estimation.	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Half of the number of scan lines to average counts for NEDT estimation	
warmview_correction_radiance_set_a	Warm view correction factor for each channel and reference instrument temp - Set A	NC_FLOAT		n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Warm view correction factor for each channel and reference instrument temp - Set A	
<i>units</i>	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm	
warmview_correction_radiance_set_b	Warm view correction factor for each channel and reference instrument temp - Set B	NC_FLOAT		n_channels, n_temp_ref_inst

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Warm view correction factor for each channel and reference instrument temp - Set B	
<i>units</i>	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm	
coldview_correction_radiance	Cold view correction factor for each cold view position and channel	NC_FLOAT		n_pos_cold, n_channels
<i>long_name</i>	Description of variable	NC_STRING	Cold view correction factor for each cold view position and channel	
<i>units</i>	Physical units	NC_STRING	mW m ⁻² sr ⁻¹ cm	
nedt_threshold_requirements	Threshold NEDT according to requirements	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Threshold NEDT according to requirements	
<i>units</i>	Physical units	NC_STRING	K	
nedt_integration_time_scaling	NEDT scaling factor to consider the integration time across the channel FOV	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	NEDT scaling factor to consider the integration time across the channel FOV	
min_num_blocks_stripping_ratio	Minimum number of blocks for a reliable stripping ratio	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Minimum number of blocks for a reliable stripping ratio	
threshold_stripping_ratio	Threshold stripping ratio triggering a flag	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Threshold stripping ratio triggering a flag	
threshold_madtest_earthview	Threshold factor in MAD (Median Absolute Deviation) test for outliers - Earth view	NC_FLOAT		n_channels_os
<i>long_name</i>	Description of variable	NC_STRING	Threshold factor in MAD (Median Absolute Deviation) test for outliers - Earth view	

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Variables Name	Description	Type	Range or Value	Dimension
min_number_samples_madtest	Minimum number of samples passing the MAD test and used to evaluate mean and standard deviation of Channel 1 and Channel 2 oversamples	NC_SHORT		1
long_name	Description of variable	NC_STRING	Minimum number of samples passing the MAD test and used to evaluate mean and standard deviation of Channel 1 and Channel 2 oversamples	

Table 20: MWS L1B calibration group variables for MWS_1B_AUX_CCDB auxiliary data

3.6.5.7 Group Name: navigation

3.6.5.7.1 navigation: Dimensions

Dimension Name	Description	Range or Value
n_resol	Number of resolutions for LSM and DEM association	2
n_coef_tb_moon	Number of coefficients for Moon disk TB evaluation	3

Table 21: navigation group dimensions for MWS_1B_AUX_CCDB auxiliary data

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3.6.5.7.2 navigation: Variables

This section describes the format of the navigation group parameters. Colours are used to differentiate variable and attributes: variables are in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Range or Value	Dimension
mws_time_offset	MWS instrument time offset	NC_FLOAT		1
long_name	Description of variable	NC_STRING	MWS instrument time offset	
units	Physical units	NC_STRING	s	

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Variables Name	Description	Type	Range or Value	Dimension
mws_yaw_correction	MWS instrument yaw correction	NC_FLOAT		
<i>long_name</i>	Description of variable	NC_STRING	MWS instrument yaw correction	
<i>units</i>	Physical units	NC_STRING	degrees	
mws_pitch_correction	MWS instrument pitch correction	NC_FLOAT		
<i>long_name</i>	Description of variable	NC_STRING	MWS instrument pitch correction	
<i>units</i>	Physical units	NC_STRING	degrees	
mws_roll_correction	MWS instrument roll correction	NC_FLOAT		
<i>long_name</i>	Description of variable	NC_STRING	MWS instrument roll correction	
<i>units</i>	Physical units	NC_STRING	degrees	
moon_angle_threshold	Moon angle threshold	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Moon angle threshold	
<i>units</i>	Physical units	NC_STRING	degrees	
moon_radius	Moon radius	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Moon radius	
<i>units</i>	Physical units	NC_STRING	km	
tb_moon_coef	Coefficients to evaluate Moon disk brightness temperatures	NC_FLOAT		n_channels, n_coef_tb_moon
<i>long_name</i>	Description of variable	NC_STRING	Coefficients to evaluate Moon disk brightness temperatures	
<i>units</i>	Physical units	NC_STRING	K	
lsmdem_search_resolution	Resolutions for LSM and DEM association	NC_FLOAT		n_resolution
<i>long_name</i>	Description of variable	NC_STRING	Resolutions for LSM and DEM association	
<i>units</i>	Physical units	NC_STRING	km	

Table 22: MWS L1B navigation group variables for MWS_1B_AUX_CCDB auxiliary data

3.6.5.8 Group Name: instrument

3.6.5.8.1 instrument: Dimensions

Dimension Name	Description	Range or Value
n_prts	Number of warm view PRTs	6
n_precision_resistors	Number of precision resistors	6
n_thermistor	Number of instrument thermistors	39
n_coef_prt_count_to_res	Number of coefficients used in the conversion of PRT counts to resistance	2
n_coef_prt_res_to_temp	Number of coefficients used in the conversion of PRT resistance to temperature	6
n_coef_therm_count_to_res	Number of coefficients used in the conversion of thermistor counts to resistance	3
n_coef_therm_res_to_temp	Number of coefficients used in the conversion of thermistor resistance to temperature	7

Table 23: MWS L1B instrument group dimensions for MWS_1B_AUX_CCDB auxiliary data

3.6.5.8.2 instrument: Variables

Variables Name	Description	Type	Range or Value	Dimension
ccdb_instrument_model	Identifier of the MWS instrument model for which this CCDB has been generated	NC_UBYTE		1
long_name	Description of variable	NC_STRING	Identifier of the MWS instrument model for which this CCDB has been generated	
oversampling_factor	Number of oversampled pixels for channels 1 and 2	NC_SHORT	16	1
long_name	Description of variable	NC_STRING	Number of oversampled pixels for channels 1 and 2	
n_thermometer_external	Number of thermometers external to the instrument	NC_SHORT	4	1
long_name	Description of variable	NC_STRING	Number of thermometers external to the instrument	
n_current_motor	Number of motor currents	NC_SHORT		1

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Number of motor currents	
n_instrument_current	Number of instrument currents	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Number of instrument currents	
n_instrument_voltage	Number of instrument voltages	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Number of instrument voltages	
prid_science	Process ID (PRID) for science data telemetry	NC_SHORT		1
<i>long_name</i>	Description of variable	NC_STRING	Process ID (PRID) for science data telemetry	
precision_resistances_set_a	Resistances of the high precision resistors: set A	NC_FLOAT		n_precision_resistors
<i>long_name</i>	Description of variable	NC_STRING	Resistances of the high precision resistors: set A	
<i>units</i>	Physical units	NC_STRING	ohm	
precision_resistances_set_b	Resistances of the high precision resistors: set B	NC_FLOAT		n_precision_resistors
<i>long_name</i>	Description of variable	NC_STRING	Resistances of the high precision resistors: set B	
<i>units</i>	Physical units	NC_STRING	ohm	
prt_counts_to_resistance_conv_coef	PRT count to resistance default conversion coefficients	NC_FLOAT		n_coef_prt_count_to_res
<i>long_name</i>	Description of variable	NC_STRING	PRT count to resistance default conversion coefficients	
<i>units</i>	Physical units	NC_STRING	ohm, ohm counts ⁻¹	
prt_resistance_to_temp_conv_coef_set_a	PRT resistance to temperature conversion coefficients: set A	NC_FLOAT		n_prts, n_coef_prt_res_to_temp
<i>long_name</i>	Description of variable	NC_STRING	PRT resistance to temperature conversion coefficients: set A	
<i>units</i>	Physical units	NC_STRING	K, K ohm ⁻¹ , K ohm ⁻² , K ohm ⁻³ , K ohm ⁻⁴ , K ohm ⁻⁵	

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Variables Name	Description	Type	Range or Value	Dimension
prt_resistance_to_temp_conv_coef_set_b	PRT resistance to temperature conversion coefficients: set B	NC_FLOAT		n_prts, n_coef _prt_res_to_temp
<i>long_name</i>	Description of variable	NC_STRING	PRT resistance to temperature conversion coefficients: set B	
<i>units</i>	Physical units	NC_STRING	K, K ohm ⁻¹ , K ohm ⁻² , K ohm ⁻³ , K ohm ⁻⁴ , K ohm ⁻⁵	
prt_resistance_tp_w_set_a	PRT resistance at triple point of water: set A	NC_FLOAT		n_prts
<i>long_name</i>	Description of variable	NC_STRING	PRT resistance at triple point of water: set A	
<i>units</i>	Physical units	NC_STRING	ohm	
prt_resistance_tp_w_set_b	PRT resistance at triple point of water: set B	NC_FLOAT		n_prts
<i>long_name</i>	Description of variable	NC_STRING	PRT resistance at triple point of water: set B	
<i>units</i>	Physical units	NC_STRING	ohm	
prt_minimum_reasonable_temperature	Minimum reasonable PRT temperature	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Minimum reasonable PRT temperature	
<i>units</i>	Physical units	NC_STRING	K	
prt_maximum_reasonable_temperature	Maximum reasonable PRT temperature	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Maximum reasonable PRT temperature	
<i>units</i>	Physical units	NC_STRING	K	
prt_weighting_coef_set_a	Weighting coefficients for each PRT: set A	NC_FLOAT		n_prts
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficients for each PRT: set A	
prt_weighting_coef_set_b	Weighting coefficients for each PRT: set B	NC_FLOAT		n_prts
<i>long_name</i>	Description of variable	NC_STRING	Weighting coefficients for each PRT: set B	
thermistor_counts_to_resistance_conversion_coef	Thermistor count to resistance conversion coefficients	NC_FLOAT		n_coef _therm_count_to_res
<i>long_name</i>	Description of variable	NC_STRING	Thermistor count to resistance conversion coefficients	
<i>units</i>	Physical units	NC_STRING	counts, counts, ohm	

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Variables Name	Description	Type	Range or Value	Dimension
thermistor_resistance_to_temp_conversion_coef	Thermistor resistance to temperature conversion coefficients	NC_FLOAT		n_coef_therm_res_to_temp
<i>long_name</i>	Description of variable	NC_STRING	Thermistor resistance to temperature conversion coefficients	
<i>units</i>	Physical units	NC_STRING	K, K ohm ⁻¹ , K ohm ⁻² , K ohm ⁻³ , K ohm ⁻⁴ , K ohm ⁻⁵ , K ohm ⁻⁶	
mean_reference_thermistor_log_resistance	Base-10 logarithm of the mean of pre-launch characterised thermistor resistance normalized to 1 ohm	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Base-10 logarithm of the mean of pre-launch characterised thermistor resistance normalized to 1 ohm	
<i>units</i>	Physical units	NC_STRING	ohm (log10)	
stdev_reference_thermistor_log_resistance	Base-10 logarithm of the standard deviation of pre-launch characterised thermistor resistance normalized to 1 ohm	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Base-10 logarithm of the standard deviation of pre-launch characterised thermistor resistance normalized to 1 ohm	
<i>units</i>	Physical units	NC_STRING	ohm (log10)	
thermistor_minimum_reasonable_temperature	Minimum reasonable thermistor temperature	NC_FLOAT		n_thermistor
<i>long_name</i>	Description of variable	NC_STRING	Minimum reasonable thermistor temperature	
<i>units</i>	Physical units	NC_STRING	K	
thermistor_maximum_reasonable_temperature	Maximum reasonable thermistor temperature	NC_FLOAT		n_thermistor
<i>long_name</i>	Description of variable	NC_STRING	Maximum reasonable thermistor temperature	
<i>units</i>	Physical units	NC_STRING	K	

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Variables Name	Description	Type	Range or Value	Dimension
nonlinearity_correction_coef_set_a	Non-linearity correction coefficients: set A	NC_FLOAT		n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Non-linearity correction coefficients: set A	
<i>units</i>	Physical units	NC_STRING	counts ⁻¹	
nonlinearity_correction_coef_set_b	Non-linearity correction coefficients: set B	NC_FLOAT		n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Non-linearity correction coefficients: set B	
<i>units</i>	Physical units	NC_STRING	counts ⁻¹	
postdetection_amplifier_gain_coef	Post-detection amplifier gain coefficients	NC_FLOAT		n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Post-detection amplifier gain coefficients	
rotating_mirror_reflectivity_perpendicular	Rotating mirror reflectivity (perpendicular)	NC_FLOAT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Rotating mirror reflectivity (perpendicular)	
instrument_reference_temperatures	Instrument reference temperatures	NC_FLOAT		n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Instrument reference temperatures	
<i>units</i>	Physical units	NC_STRING	K	

Table 24: MWS L1B instrument temperature group variables for MWS_1B_AUX_CCDB auxiliary data

3.6.5.9 *Group Name: scanning*

3.6.5.9.1 *scanning: Dimensions*

No dimensions.

3.6.5.9.2 *scanning: Variables*

This section shall describe the variables for the scan parameters. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Range or Value	Dimension
scan_duration	MWS Scan duration	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	MWS scan duration	
<i>units</i>	Physical units	NC_STRING	s	
scan_time_tolerance	Maximum time difference between the end of previous scan line to the start of the present scan line in seconds.	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Maximum time difference between the end of previous scan line to the start of the present scan line in seconds	
<i>units</i>	Physical units	NC_STRING	s	
scan_time_start_to_first_fov_earthview	Time from MWS scan-start to first FOV: Earth-view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Time from MWS scan-start to first FOV: Earth view	
<i>units</i>	Physical units	NC_STRING	s	
scan_time_between_consecutive_fovs_earthview	Time between consecutive MWS FOVs: Earth view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Time between consecutive MWS FOVs: Earth view	
<i>units</i>	Physical units	NC_STRING	s	

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Variables Name	Description	Type	Range or Value	Dimension
scan_stepping_angle_earthview	MWS scan stepping angle: Earth view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	MWS scan stepping angle: Earth view	
<i>units</i>	Physical units	NC_STRING	degrees	
scan_duration_earthview	MWS scan duration: Earth view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	MWS scan duration: Earth view	
<i>units</i>	Physical units	NC_STRING	s	
scan_time_start_to_first_fov_coldview	Time from MWS scan-start to first FOV: coldview	NC_FLOAT		n_pos_cold
<i>long_name</i>	Description of variable	NC_STRING	Time from MWS scan-start to first FOV: cold view	
<i>units</i>	Physical units	NC_STRING	s	
scan_time_between_consecutive_fovs_coldview	Time between consecutive MWS FOVs: cold view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Time between consecutive MWS FOVs: cold view	
<i>units</i>	Physical units	NC_STRING	s	
scan_stepping_angle_coldview	MWS scan stepping angle: cold view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	MWS scan stepping angle: cold view	
<i>units</i>	Physical units	NC_STRING	degrees	
scan_duration_coldview	MWS scan duration: cold view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	MWS scan duration: cold view	
<i>units</i>	Physical units	NC_STRING	s	
scan_time_start_to_first_fov_warmview	Time from MWS scan-start to first FOV: Warm view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Time from MWS scan-start to first FOV: warm view	

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Variables Name	Description	Type	Range or Value	Dimension
<i>units</i>	Physical units	NC_STRING	s	
scan_time_between _consecutive_fovs_ warmview	Time between consecutive MWS FOVs: Warm view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	Time between consecutive MWS FOVs: warm view	
<i>units</i>	Physical units	NC_STRING	s	
scan_stepping_angle _warmview	MWS scan stepping angle: Warm view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	MWS scan stepping angle: warm view	
<i>units</i>	Physical units	NC_STRING	degrees	
scan_duration_warm view	MWS scan duration: Warm view	NC_FLOAT		1
<i>long_name</i>	Description of variable	NC_STRING	MWS scan duration: warm view	
<i>units</i>	Physical units	NC_STRING	s	

Table 25: MWS L1B scanning group variables for MWS_1B_AUX_CCDB auxiliary data

3.6.5.10 Group Name: *antenna_correction*

3.6.5.10.1 *antenna_correction*: Dimensions

No dimensions.

3.6.5.10.2 *antenna_correction*: Variables

This section shall describe the Variables for the *antenna_correction* parameters internal file. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Range or Value	Dimension
antenna_pattern_ve rsion	Version of the antenna pattern correction	NC_SHORT		1
<i>long_name</i>	Description of variable		Version of the antenna pattern correction	
antenna_efficiency_ earth_cpol	Antenna Efficiency: Earth, copolar	NC_FLOAT		n_fovs, n_channels
<i>long_name</i>	Description of variable	NC_STRING	Antenna efficiency: Earth, copolar	

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Variables Name	Description	Type	Range or Value	Dimension
antenna_efficiency_earth_xpol	Antenna Efficiency: Earth, crosspolar	NC_FLOAT		n_fovs, n_channels
<i>long_name</i>	Description of variable	NC_STRING	Antenna efficiency: Earth, crosspolar	
antenna_efficiency_satplatform	Antenna Efficiency: Satellite Platform	NC_FLOAT		n_fovs, n_channels
<i>long_name</i>	Description of variable	NC_STRING	Antenna efficiency: Satellite Platform	
antenna_efficiency_space	Antenna Efficiency: Space	NC_FLOAT		n_fovs, n_channels
<i>long_name</i>	Description of variable	NC_STRING	Antenna efficiency: Space	
antenna_hpbw_cold_view_moon	Cold view antenna half power beam width (HPBW) for Moon contamination radiance	NC_FLOAT		n_pos_cold, n_fovs_cal, n_channels
<i>long_name</i>	Description of variable	NC_STRING	Cold view antenna half power beam width (HPBW) for Moon contamination radiance	
<i>units</i>	Physical units	NC_STRING	degrees	

Table 26: MWS L1B antenna_correction variables for MWS_1B_AUX_CCDB auxiliary data

3.6.5.11 *Group Name: non_nominal_processing*

3.6.5.11.1 *non_nominal_processing: Dimensions*

No dimensions.

3.6.5.11.2 *non_nominal_processing: Variables*

This section describes the Variables for the non_nominal_processing parameters auxiliary data file MWS_1B_AUX_CCDB. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Range or Value	Dimension
calib_coef_default t_zero_order	Default a_0 calibration coefficient for each reference temperature	NC_INT		n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Default a_0 calibration coefficient for each reference temperature	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm}$	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-9}	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	
calib_coef_default t_first_order	Default a_1 calibration coefficient for each reference temperature	NC_INT		n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Default a_1 calibration coefficient for each reference temperature	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm counts}^{-1}$	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-13}	
<i>add_offset</i>	<i>Offset applied</i>	NC_DOUBLE	0.0	
calib_coef_default t_second_order	Default a_2 calibration coefficient for each reference temperature	NC_INT		n_channels, n_temp_ref_inst

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Variables Name	Description	Type	Range or Value	Dimension
<i>long_name</i>	Description of variable	NC_STRING	Default a_2 calibration coefficient for each reference temperature	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm counts}^{-2}$	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-19}	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	
maxdif_calib_coef_zero_order	Max difference allowed between the default values of a_0 and the one in the context data file	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Max difference allowed between the default values of a_0 and the one in the context data file	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm}$	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-9}	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	
maxdif_calib_coef_first_order	Max difference allowed between the default values of a_1 and the one in the context data file	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Max difference allowed between the default values of a_1 and the one in the context data file	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm counts}^{-1}$	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-13}	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	

EPS-SG MWS Level 1B Auxiliary Data Specification (ADS)

Variables Name	Description	Type	Range or Value	Dimension
maxdif_calib_coef_second_order	Max difference allowed between the default values of a_2 and the one in the context data file	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Max difference allowed between the default values of a_2 and the one in the context data file	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm counts}^{-2}$	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-19}	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	
radiance_rr_default	Default reflector radiances for each reference temperature	NC_INT		n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Default reflector radiances for each reference temperature	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm}$	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10^{-8}	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	
maxdif_radiance_rr	Max difference allowed between the default values of reflector radiance and the ones in the context data file	NC_INT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Max difference allowed between the default values of reflector radiance and the ones in the context data file	
<i>units</i>	Physical units	NC_STRING	$\text{mW m}^{-2} \text{sr}^{-1} \text{cm}$	

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Variables Name	Description	Type	Range or Value	Dimension
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10 ⁻⁸	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	
tmax_context_val id	Maximum time validity of the context data file	NC_SHORT		n_channels
<i>long_name</i>	Description of variable	NC_STRING	Maximum time validity of the context data file	
<i>units</i>	Physical units	NC_STRING	s	
calibration_gain_de fault	Default calibration gain for each reference temperature	NC_UINT	valid_min to valid_max	n_channels, n_temp_ref_inst
<i>long_name</i>	Description of variable	NC_STRING	Default calibration gain for each reference temperature	
<i>units</i>	Physical units	NC_STRING	counts K ⁻¹	
<i>scale_factor</i>	Scale factor applied	NC_DOUBLE	10 ⁻⁶	
<i>add_offset</i>	Offset applied	NC_DOUBLE	0.0	

Table 27: MWS L1B non_nominal_processing variables for MWS_1B_AUX_CCDB auxiliary data

3.7 MWS L1B Processor Configuration Files

3.7.1 Purpose and Description

This file contains the information about the processor input and output data format and running setup parameters. It is specific to the MWS L1B Local Processor.

3.7.2 Auxiliary Data Summary Sheet

Name	MWS L1B Processor Configuration Files
Description	Contains the information used by the Local Processor about the input and output data format and running setup parameters
Example of Filename	SGA1_MWS_1B_AUX_COF____S20240101120000Z_Exxxx xxxxxxxxxZ_G20200101120000Z_LP_OPE_OPER.SIP
Spacecraft	SGA[1-3]_
Auxiliary Data ID (ADF-ID)	MWS_1B_AUX_CNF_
Source	LP (Local Processing component)
Members	4
Example of internal filename	MWS_L1B_AUX_CNF0_vxyxy.xml
Format of internal file(s)	XML
Auxiliary Data Size (MB)	~1 MB
Generation Frequency	Infrequently
Validity	Start validity = as indicated in the filename End validity = as indicated in the filename Validity duration = according to start/end validity time

3.7.2.1 Format

The physical structure and data file components is shown in **Error! Reference source not found..** It is composed of one XML header file and four configuration files also in XML format.

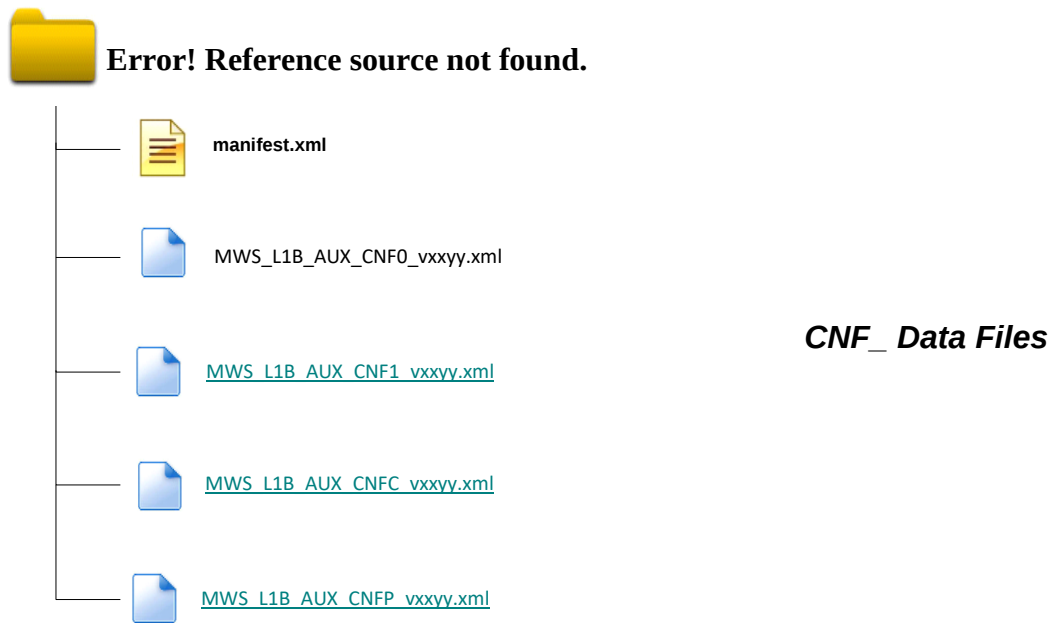


Figure 5 – Structure of the configuration file

3.7.2.2 **Format of Data Files**

File are provided in XML format and are fully described in Appendix A.

APPENDIX A XML DESCRIPTION OF EPS-SG MWS L1B AUXILIARY DATA

The XML representation of the auxiliary data file MWS_1B_AUX_LSM can be found in:



MWS_L1B_AUX_LSM_V5.xml

The XML representation of the auxiliary data file MWS_1B_AUX_DEM can be found in:



MWS_L1B_AUX_DEM_V5.xml

The XML representation of the auxiliary data file MWS_1B_AUX_CFI can be found in:



MWS_L1B_AUX_CFI_V5.xml

The XML representation of the auxiliary data file MWS_1B_AUX_CCDB can be found in:



MWS_L1B_AUX_CCDB_V5.xml

The XML representation of the auxiliary data file MWS_1B_AUX_COF can be found in:



MWS_L1B_AUX_COF_V5.xml

Examples of the MWS_1B_AUX_CNF files are given below:



MWS_L1B_AUX_CNF0_v0001.xml



MWS_L1B_AUX_CNF1_v0001.xml



MWS_L1B_AUX_CNFC_v0001.xml



MWS_L1B_AUX_CNFP_v0001.xml

APPENDIX B OPEN ISSUES AND ASSUMPTIONS

D.1: TBDs

The following table presents the TBDs.

ID	Section	Title	Description
-	-	-	-

D.2: TBCs

The following table presents the TBCs.

ID	Section	Title	Description
TBC-01	2.3	Context file	The contents of Context file is not finalised yet. Accordingly, the size of Context file can change. The latest estimate is of 1.0 MB.
TBC-02	3.6	Number of FOVS	The number of FOVS per scan is TBC. According to the latest MWS Instrument Design and Technical Description document, this can be a number ranging from 87-95. This ADS document assumes a value of 95 for estimating the data size.
TBC-03	3.6	HPR data	Number of high precision resistors and their resistances is TBC. According to the latest MWS Characterisation and Calibration Database document, this can be a number ranging from 3-6.
TBC-04	3.6	PRTs	Number of PRTs is TBC. According to the latest MWS Characterisation and Calibration Database document, this can be a number ranging from 4-6.
TBC-05	3.6	Number of reference instrument temperatures	Number of reference temperatures is TBC. We have assumed that this number is 15.