Sentinel-6/Jason-CS ALT Level 1 Auxiliary Data Specifications (L1 ALT ADS)

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Document Change Record

Version	Date of Version as on profile	Document Change Request (DCR) Number if applicable	Description of changes
1 Draft	03/02/2017		First Draft Version
1A	07/02/2017		Initial version for internal review
1B	09/02/2017		Version released for System PDR
1C	30/03/2017		Version pre-released for the PDAP ITT Consolidation of the document based on the update of the ALT PGS documents; some files are considered applicable to the L1 and L2 ALT PGS and therefore have been moved to the GADS and cancelled from this document: - Poseidon-4 Characterization File - Poseidon-4 Configuration file - Poseidon-4 Constant File - Poseidon-4 Characterization Arrays File - Poseidon-4 Weightings files Specification of 4 different LTM files: - Poseidon-4 HR CAL1 LTM file - Poseidon-4 LR CAL1 LTM file - Poseidon-4 ECHO CAL LTM file - Poseidon-4 CAL2 LTM file
1D	15/05/2017		Version for the PDAP ITT including minor editorial changes
1E	20/12/2017		The document was fully revisited and completed with missing information. Included clarification on the scope of the document Included Poseidon-4 L1 Configuration file based on the L1 GPP IODD. Cancelled previous AD-4 as it was a document internal to SALP Removed File “Satellite Centre of Mass” as it is defined in the GADS document Closed O-1 as all providers/sources of the L1 ADFs have been identified Introduced O-2 on the format and detailed specifications of the ADFs from SALP. Removed A-2 as the PDAP will have a function to format the ADFs into SAFE format.

1F	19/01/2018		Version addressing RIDs raised during internal review of V1E.
2	24/01/2018	JCS_DCR_6	Version released for the PDAP KO
2A	16/04/2018		The document was revisited and completed with missing information. • Internal File Types are defined • Updated Table 4 5: LTM NetCDF variables • Updated L1 Configuration File Section 4.1.1.4: Introduction of a new xml file as part of the Poseidon-4 Configuration File (SAFE package) to be defined by the PDAP Team based on the ALT L1 PGS and ALT L1 PFS. • Updated the Platform File: size in line with CNES ICD; Table 4-2 Tag names/description • Updated Open Issues Section 1.6 and cross-referenced TBDs/TBCs to Open Issues • Updated Table 3-1: Altimeter Level 1 Auxiliary Data Summary
2B	19/04/2018	JCS_DCR_62	Version released for PDAP data package #2
2C	14/09/2018		The document was revisited and completed with missing information. Closed O- 1, O-2 and O-3
2D			Version addressing comments from the internal review of V2C. Updated Applicable Documents list: included AD – 7, Sentinel-6/Jason-CS ALT Level 1 NetCDF Dump as a reference for the specifications of the LTM files. The tables defining the LTM format in V2B have been removed in favour of AD – 7.
3	24/10/2018	JCS_DCR_141	Version released for the System Check Point#2/CDR
3A	10/04/2019	JCS_DCR_183	Version addressing comments/RIDs from the System Check Point#2/CDR: - RID_032: Replaced “internal file” by “Data File”; - RID 031: Section 2 was updated with a clarification about the SAFE files wrapping, performed by a dedicated function of the PDP. L1 Configuration file update, new parameters included: - “preferred_mode_simultaneous” for the L2x mode in the HR Processor (raw_rmc_hr_cnf); - “netcdf_compression_level_” for all processors Fixed typos.

			Removed empty lines, updated formatting of tables and NetCDF dumps for clarity; not shown in track changes. Moved specification of Characterisation Arrays file (CHAN_AX and CHAR_AX) and Weightings file (WEIG_AX) from GADS to L1 ADS as they are only used by the L1 processor. Some minor updates to the file sizes. Section 4.2.1 and 4.2.2: updated the source/data provider identifier in the example filenames, in line with the GFNC definition of Generating Centres for the Auxiliary Data File. i.e. the identifier of ADFs from “CNES/SALP” is “SALP”. Section 4.2.3: removed information on the LTM files frequency, as it is related to the calibration modes repeat interval and duration, which is part of the L0 specifications.
V4	19/11/2019	JCS_DCR_308	Replaced Sentinel-6/Jason-CS by Jason-CS/Sentinel-6. Updated Sections: 4.1.1 Poseidon-4 L1 Configuration File 4.1.2 Poseidon-4 Characterization Arrays File 4.2.3 Poseidon-4 Long Term Monitoring (LTM) files Added clarification on the mission dependency on the summary Table 3-1: All ADFs used in the L1 PGF are Mission Dependent (S6A/B).
V4B	16/06/2020	JCS_DCR_396	Reverted to using Sentinel-6/Jason-CS again. Updates related to redmine#1880, discussed during the ALT L1 V3-CR#1 workshop: - 4.2.2 USO file: header size update; - 4.2.3 LTM files: clarification that also dimension and variable should be removed; - 4.1.1 Configuration File description was updated to reflect the customization of the file performed by isardSAT and Appendix A was created presenting the new variables added to the configuration file Section 4.2.1: Added clarification on the Platform Files as per redmine#1873, point 11: the Platform file does account for any misspointing biases measured during commissioning. Updated filename examples and clarified the generation frequency and validity of the files; Replaced LTM file sizes with reference document: AD-7.

V4C	25/05/2021	JCS_DCR_533	Section 4.1.1: Configuration File, included a reference to Appendix A; Static ADFs: updated the examples of data file names, in-line with the S6A launch version files. Section 4.2.3.4: added a clarification on the variables which are arrays in the LTM files, i.e. time dimension is included. Cosmetic changes.

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1 INTRODUCTION

1.1 Purpose and Scope

This document is the Auxiliary Data Specification for the Sentinel-6/Jason-CS Altimetry Level 1 Auxiliary Data sets used or generated by the Sentinel-6/Jason-CS Payload Data Acquisition and Processing (PDAP) facilities. It specifies the format of the Altimeter Level 1 Auxiliary Data in agreement with the format set out in the Sentinel-6/Jason-CS Generic Auxiliary Data Specification (GADS) [AD- 1], applicable to all Sentinel-6/Jason-CS Auxiliary Data Files.

Only Auxiliary Data files (ADF) used exclusively by the L1 ALT Processor are defined in the present document. Other ADFs are used by the L1 ALT Processor, although as they are used by more than one processor they are specified in the GADS [AD- 1].

The naming conventions are defined in the Sentinel-6/Jason-CS File Naming Convention [AD-2].

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, Calibration Data and Observation & Forecast Data.

1.2 Applicable Documents

ID	Reference and Version	Title
AD- 1	EUM/LEO-JASCS/SPE/17/899450	Sentinel-6/Jason-CS Generic Auxiliary Data Specification (GADS)
AD- 2	EUM/LEO-JASCS/SPE/17/899011	Jason-CS/Sentinel-6 File Naming Convention
AD- 3	EO-MA-DMS-GS-0007	Earth Observation Mission CFI Software EO_DATA_HANDLING Software User Manual
AD- 4	EUM/LEO-JASCS/DOC/17/912241	Sentinel-6_Jason-CS-Metadata Specification
AD- 5	EUM/LEO-JASCS/SPE/17/897975	Sentinel-6/Jason-CS Generic Product Format Specification (GPFS)
AD- 6	SMM-IF-M6-EA-20174-CN	Specifications D'Interfaces Interne SSALTO: Orbitographie Mission
AD- 7	EUM/LEO-JASCS/SPE/17/947129	Sentinel-6/Jason-CS ALT Level 1 NetCDF Dump

1.3 Reference Documents

ID	Reference and Version	Title

RD- 1	EUM/LEO-JASCS/DEF/13/695184	Sentinel-6 Glossary of Terms and Acronyms Document

1.4 Acronyms

Acronym	*Definition*
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, Calibration Data and Observation & Forecast Data.
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 L1/L2 Product Generation Functions.
ADF	Auxiliary Data File
BoM	Beginning of Mission
CoM	Satellite Centre of Mass
DSD	Data set descriptor
ECMWF	European Centre for Medium-Range Weather Forecasts
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 Sentinel-6 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 or General Regularly-distributed Information in Binary form
GS	Ground Segment
HR	High Resolution
LR	Low Resolution
LTM	Long Term Monitoring (auxiliary data)
OSV	Orbit State Vector
MPH	Main product header
PGF	Product Generation Function - A SENTINEL-6 Ground Segment function responsible for generation of one or more mission product types in native format. It may also generate auxiliary data.
P4	Poseidon 4 altimeter
PDP	Payload Data Processing
POD	Precise Orbit Determination

SAR	Synthetic Aperture Radar
SPH	Specific product header
TBC	To be confirmed by the Agency
TBD	To be defined by the Agency
TBW	To be written by the Agency
USO	Ultra Stable Oscillator

1.5 Document structure

Section 1 provides the introduction to this document.
Section 2 provides the overall Structure of Sentinel-6/Jason-CS Altimetry L1 Auxiliary Data Files
Section 3 provides the overview of all auxiliary files used by the Altimeter L1 PGS.
Section 4 covers the detailed contents and format description of all auxiliary files used by the Altimeter L1 PGS. This section is divided in two sub-sections: Static and Dynamic

1.6 Open Issues

This section lists open issues affecting the current version of the document and their expected date of resolution.

ID	*Issue description*	*To be closed by*
OI- 1	The detailed specifications of ADFs from SALP are TBC. The specifications are based on the confirmation from SALP that the datablock of the ADFs will have the same format used for S-3 mission and that the xml headers used for S-3 will not be included. ADFs from SALP will be delivered in a package SAFE compliant with a manifest xml file and the datablock; the delivery files will be TAR. Closure note: CNES confirmed the above TBC.	closed
OI- 2	The generation frequency of the LTM files depends on the P4 instrument calibration, whenever a calibration sequence/mode telemetry is available in a dump the correspondent LTM file will be created according to the sequence/mode operated. Closure note: the indicative generation frequency is provided for each LTM file.	closed
OI- 3	The detailed specifications of ADFs from SALP are TBC. The specifications are based on the confirmation from SALP that the datablock of the ADFs will have the same format used for S-3 mission and that the xml headers used for S-3 will not be included. ADFs from SALP will be delivered in a package SAFE compliant with a manifest xml file and the datablock; the delivery files will be TAR or TGZ. Closure note: same as O- 1 The delivery time of ADFs from SALP is being discussed and is not yet confirmed.	closed

	Closure note: once agreed, the delivery time of files from SALP will be specified in the relevant ICD with CNES. This issue is considered closed as it does not affect the format of the files, described in the present document	

1.7 Assumptions

This section lists assumptions made for compiling the current version of the document.

ID	Issue description
A- 1	The files included in the SAFE folder (called "data Files") have the **original format and filename as delivered from the provider, except for SALP files which are already SAFE**.

2 OVERALL STRUCTURE OF SENTINEL-6 AUXILIARY DATA

The Sentinel-6/Jason-CS auxiliary overall structure is described in [AD- 1]. The format is a package (i.e. folder) including a single XML manifest file (including metadata describing the properties of the auxiliary data and information about which data files are part of the auxiliary data) plus the data file(s).

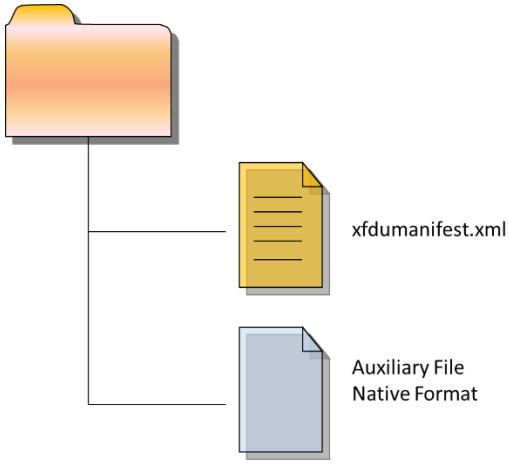

Figure 2-1: Structure of Auxiliary Data Files

Auxiliary data originated outside the PDP or produced by other Ground Segment facilities, which are non-SAFE formatted, will be "wrapped" along with the XML manifest file in the SAFE package upon entry in the GS, by a dedicated component in the PDP. The manifest file will be created by the same PDP component, based on [AD- 4]. The content of the original file(s) is kept as-is.

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

An overview of the manifest structure is presented in [AD- 1] and further described in [AD- 5]. The manifest metadata is specified in [AD- 4].

2.1 Naming Convention

The naming convention of Sentinel-6/Jason-CS Auxiliary data files complies with the naming convention specified in [AD- 2].

The present document only defines the **ADF ID** which corresponds to the "***Product Type***" element of the filename, i.e. a string of 13 characters corresponding to the group of naming elements ***SS_LL_TTTTTT***:

- Data source/consumer (SS)
- One underscore (_)
- Processing Level (LL)

- One underscore (_)
- Data File ID (TTTTTTT)

The group of naming elements that constitute the Product Type are highlighted in bold in the example below which is fully described on [AD- 2]:

MMM_**SS_LL_TTTTTTT**_yyyymmddThhmmss_yyyymmddThhmmss_yyyymmddThhmmss_<instance id>_<source>_<environment>_<class id>.<extension>

3 ALTIMETER LEVEL 1 AUXILIARY DATA OVERVIEW

This Section provides an overview of the Altimeter Level 1 Auxiliary Data files used by the Sentinel-6/Jason-CS Altimeter Level 1 Operational Processor. See Table 3-1.

Table 3-1: Altimeter Level 1 Auxiliary Data Summary[1]

Section	File	Internal/External	Static/Dynamic	Source	Generation Frequency	Format of Data file(s)	File Type of Data file(s)	ADF ID (SAFE Package) (Product Type[2])	Estimated Auxiliary Data Size (SAFE Package)
4.1.1	Poseidon-4 L1 Configuration File	I	S	EUMETSAT	Infrequently	XML	PDAP_AUX_CNF1_	P4_1__CONF_AX	< 1 MB
4.1.2	Poseidon-4 Characterisation arrays file (Nominal)	I	S	EUMETSAT	Infrequently	NetCDF4	AUX_CARRA_	P4_1__CHAN_AX	150 kB
	Poseidon-4 Characterisation arrays file (Redundant)	I	S	EUMETSAT	Infrequently	NetCDF4	AUX_CARRB_	P4_1__CHAR_AX	150 kB
4.1.3	Poseidon-4 Weightings file	I	S	EUMETSAT	Infrequently	NetCDF4	AUX_WEIGHT_	P4_1__WEIG_AX	10 kB
4.2.1	Platform File	E	D	SALP	Daily	XML	P4_1__PTFA_AX	P4_1__PTFA_AX	1.3 MB
4.2.2	DORIS USO Drift	E	D	SALP	Daily	ASCII	P4_1__USO__AX	P4_1__USO__AX	< 1 MB
4.2.3	Poseidon-4 HR CAL1 LTM file	I	D	ALT L1 CAL PGF	min 3 per day	NetCDF4	P4_1__C1HR_AX	P4_1__C1HR_AX	AD-7
4.2.3	Poseidon-4 LR CAL1 LTM file	I	D	ALT L1 CAL PGF	min 1 per cycle	NetCDF4	P4_1__C1LR_AX	P4_1__C1LR_AX	AD-7
4.2.3	Poseidon-4 ECHO CAL LTM file	I	D	ALT L1 CAL PGF	once per orbit	NetCDF4	P4_1__ECHO_AX	P4_1__ECHO_AX	AD-7
4.2.3	Poseidon-4 CAL2 LTM file	I	D	ALT L1 CAL PGF	once per year	NetCDF4	P4_1__CAL2_AX	P4_1__CAL2_AX	AD-7

[1] *All ADFs used in the L1 PGF are Mission Dependant (i.e. the SAFE package filename is S6A/B).*
[2] *Product Type as defined in the Jason-CS/Sentinel-6 Filenaming Convention [AD- 2]: group of naming elements SS_LL_TTTTTT*

4 ALTIMETER LEVEL 1 AUXILIARY DATA DETAILED FORMAT

This section describes the detailed content of each auxiliary data file listed in Table 3-1, including the format of the ancillary files where applicable.

The general physical structure and data file components of the Auxiliary Data Files is shown in Figure 2-1, and described in a separated document [AD- 1]: the format is a package (i.e. folder) including a single XML manifest file (including metadata describing the properties of the auxiliary data and information about which data files are part of the auxiliary data) plus a number of files which form the auxiliary data itself.

The files included in the package (called "Data Files") have the original format as delivered from the provider.

4.1 Static Auxiliary Data Files

4.1.1 Poseidon-4 L1 Configuration File

4.1.1.1 Purpose and description

The Poseidon-4 L1 Configuration file contains the L1 processors switches, which can be modified without the need of re-compiling the s/w.

4.1.1.2 Auxiliary Data Summary Sheet

Description	Contains all the processors switches
Auxiliary Data ID	P4_1__CONF_AX
Physical Structure	Manifest + 1 data file
Format of Data file(s)	XML
Example of Data file name(s)	PDAP_AUX_CNF1_S6A_001.xml
Size	< 1 MB
Generation Frequency	Infrequently
Validity	Entire Mission

4.1.1.3 Format

The SAFE folder for this data set contains:

- Manifest xml file
- One file (Poseidon-4 Configuration file) in xml format including the configuration variables defined in the GPP and new variables needed to configure the L1 ALT PGS.

4.1.1.4 Format of Poseidon-4 L1 AUX_CONF1_PGS variables

New variables have been defined by the PDAP Contractor based on the configurability described in the ALT L1 PGS. The new variables and corresponding new categories have been added to the xml file defined in the section below, based on the GPP. The customised configuration file used by the ALT L1 PGF is presented in Appendix A.

4.1.1.5 Format of Poseidon-4 L1 AUX_CONF1 variables

The L1 configuration file is an xml file and contains switches to be used by the L1 PGS. It is divided in the following categories:

- LR Processor
- HR Processor
- CAL1 LRM Processor
- CAL1 SAR Processor
- ECHO CAL Processor
- CAL2 Processor

The list of parameters defined for the different categories is presented below.

Table 4-1: List of Parameters in the L1 configuration file

Field Name	*Description*	*Units*
	LR Processor	
flag_uso_correction_lr_cnf	Flag that activates the USO: Deactivated (0); Activated (1)	flag
flag_cal1_corrections_lr_cnf	Flag that activates the CAL1 corrections: Deactivated (0); Activated (1)	flag
flag_cal1_power_lr_cnf	Flag that indicates the CAL1 power type: CAL1 L1B total power (0); CAL1 L1B max power (1)	flag
flag_cal1_delay_lr_cnf	Flag that indicates the CAL1 delay type: from cog (cog_delay) (0); from peak (internal_delay) (1)	flag
flag_cal2_correction_lr_cnf	Flag that activates the CAL2 corrections: Deactivated (0); Activated (1)	flag
flag_doppler_correction_lr_cnf	Flag that activates the Doppler correction in the Window Delay: Deactivated (0); Activated (1)	flag
doppler_correction_sign_lr_cnf	Sign of the Doppler correction: Negative (-1); Positive (1)	

Field Name	*Description*	*Units*
thermal_noise_first_range_bin_lr_cnf	First range bin (from 0, without zero padding) of the thermal noise estimation window	samples
thermal_noise_width_lr_cnf	Width of the thermal noise estimation window (without zero padding)	range bins
netcdf_compression_level_lr_cnf	Compression level of the output netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	
flag_cog_antenna_datation_correction_lr_cnf	Flag to activate the datation correction for the distance cog-antenna: Deactivated (0); Activated (1)	flag
tracker_range_L1B_reference_sample_lr_cnf	Reference sample for the tracking range. Value given without over-sampling, in the range [1:256]	samples
flag_uso_delta_lr_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
HR Processor		
flag_uso_correction_hr_cnf	Flag that activates the USO correction: Deactivated (0); Activated (1)	flag
flag_cal1_corrections_hr_cnf	Flag that activates the CAL1 power and delay corrections: Deactivated (0); Activated (1)	flag
flag_cal1_intraburst_corrections_hr_cnf	Flag that activates the CAL1 intra-burst corrections: Deactivated (0); Activated (1)	flag
flag_cal1_power_hr_cnf	Flag that indicates the CAL1 power type: CAL1 L1B total power (0); CAL1 L1B max power (1)	flag
flag_cal1_delay_hr_cnf	Flag that indicates the CAL1 delay type: from cog (cog_delay) (0); from peak (internal_delay) (1)	flag
flag_cal2_correction_hr_cnf	Flag that activates the CAL2 corrections: Deactivated (0); Activated (1)	flag
flag_azimuth_weighting_hr_cnf	Flag that activates the azimuth weighting: Deactivated (0); Activated (1) It includes two compensation factors in the sigma0 scaling factor: one for the peak power attenuation and one for the widening of the azimuth footprint	flag

Field Name	*Description*	*Units*
flag_postphase_azimuth_processing_hr_cnf	Flag that activates the post-phase azimuth correction: Deactivated (0); Activated (1)	flag
flag_azimuth_processing_method_hr_cnf	Flag that indicates the azimuth processing method: Approximate (0); Exact (1)	flag
flag_doppler_range_correction_hr_cnf	Flag that activates the Doppler range correction in the geometry corrections: Deactivated (0); Activated (1)	flag
doppler_range_correction_sign_hr_cnf	Sign of the Doppler range correction: Negative (-1); Positive (1)	
flag_slant_range_correction_hr_cnf	Flag that activates the slant range correction in the geometry corrections: Deactivated (0); Activated (1)	flag
flag_window_delay_alignment_method_hr_cnf	Flag to indicate the window delay alignment method: Satellite position above surface (0); Maximum elevation (alt – wd) (1); Minimum elevation (alt – wd) (2); OCOG (3)	flag
ocog_offset_value_hr_cnf	OCOG offsetvalue used when using the “OCOG” method in the flag_window_delay_alignment_method	m
flag_remove_doppler_ambiguities_hr_cnf	Flag that indicates if the Doppler ambiguities will be removed: No (0); Yes (1)	flag
ambiguity_mask_margin_hr_cnf	Margin used in the ambiguity mask to avoid the inclusion of the leading edge (a positive value means that more samples are cut)	non-zp samples
flag_antenna_weighting_hr_cnf	Flag that activates the antenna weighting: Deactivated (0); Activated (1)	flag
flag_surface_weighting_hr_cnf	Flag that activates the surface weighting: Deactivated (0); Activated (1)	flag
flag_avoid_zeros_in_multilooking_hr_cnf	Flag that indicates if the samples set to zero in the beams will be avoided when averaging in multi-looking: No (0); Yes (1)	flag

Field Name	*Description*	*Units*
flag_l1bs_file_hr_cnf	Flag that activates the writing of the L1B-S file: Deactivated (0); Activated (1)	flag
flag_l1bs_no_zp _hr_cnf	Flag that removes the zero padding in the L1B-S waveforms, only in the product: Keep ZP (0); Undo ZP (1)	flag
zp_fact_range_hr_cnf	Zero padding factor used during range compression	
N_looks_stack_hr_cnf	Number of looks in 1 stack. In case the total number of looks is greater than N_looks_stack_hr_cnf, only the central (with respect to the look angle) N_looks_stack_hr_cnf are considered in the L1B-S and L1B products.	
flag_height_rate_application_hr_cnf	Switch to remove the CAI/FAI correction applied to each waveform by the altimeter and apply the height rate correction from the orbit: keep altimeter alignment (0), apply height rate alignment (1)	
rmc_stack_mask_margin_hr_cnf	Margin to be added to the RMC stack mask: a positive value will reduce the number of RMC valid samples (N_samples_rmc_chd) and means that more samples are cut.	non-zp samples
thermal_noise_first_range_bin_hr_cnf	First range bin (from 0, without zero padding) of the thermal noise estimation window	samples
thermal_noise_width_hr_cnf	Width of the thermal noise estimation window (without zero padding)	range bins
flag_l1bs_wfm_sample_type_hr_cnf	Variable type of the waveform I&Q samples in the L1B-S file: signed byte (0); signed short (1)	Flag
preferred_mode_simultaneous_raw_rmc_hr_cnf	It specifies which mode will be processed in case of simultaneous raw and rmc acquisition (TM mode ID equal to LX2_CL or TRP): 0: RAW, 1: RMC, 2: Both RAW and RMC	
netcdf_compression_level_hr_cnf	Compression level of the output netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	

Field Name	*Description*	*Units*
flag_cog_antenna_datation_correction_hr_cnf	Flag to activate the datation correction for the distance cog-antenna: Deactivated (0); Activated (1)	flag
tracker_range_L1B_reference_sample_hr_cnf	Reference sample for the tracking range. Value given without over-sampling, in the range [1:256]	Samples
flag_uso_delta_hr_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
CAL1 LRM Processor		
flag_uso_correction_cal1_lrm_cnf	Flag that activates the USO: Deactivated (0); Activated (1)	flag
flag_cal2_correction_cal1_lrm_cnf	Flag that activates the CAL2 corrections: Deactivated (0); Activated (1)	flag
num_lobes_int_cal1_lrm_cnf	Number of secondary lobes to interpolate at each side in addition to the main lobe [0,4]	
k_fact_int_cal1_lrm_cnf	PTR waveform interpolation factor for the parameters retrieval	
num_samp_out_wfm_cal1_lrm_cnf	Number of PTR waveform samples showed in CAL1 L1B output file	
zero_pad_fact_cal1_lrm_cnf	P4 oversamples the waveform by a factor of 64. The Processor does a further interpolation by zero_pad_fact_cal1_lrm_cnf/64	
netcdf_compression_level_cal1_lrm_cnf	Compression level of the output netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	
flag_uso_delta_cal1_lrm_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
CAL1 SAR Processor		
flag_uso_correction_cal1_sar_cnf	Flag that activates the USO: Deactivated (0); Activated (1)	flag
flag_cal2_correction_cal1_sar_cnf	Flag that activates the CAL2 corrections: Deactivated (0); Activated (1)	flag
zero_pad_fact_cal1_sar_cnf	Zero Padding Factor	

Field Name	*Description*	*Units*
num_lobes_int_cal1_sar_cnf	Number of secondary lobes to interpolate at each side in addition to the main lobe [0,4]	
k_fact_int_cal1_sar_cnf	PTR waveform interpolation factor for the parameters retrieval	
num_samp_out_wfm_cal1_sar_cnf	Number of PTR waveform samples showed in CAL1 L1B output file	
netcdf_compression_level_cal1_sar_cnf	Compression level of the output netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	
flag_uso_delta_cal1_sar_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
ECHO CAL Processor		
flag_uso_correction_cal1_pulse_cnf	Flag that activates the USO: Deactivated (0); Activated (1)	flag
flag_cal2_correction_cal1_pulse_cnf	Flag that activates the CAL2 corrections: Deactivated (0); Activated (1)	flag
zero_pad_fact_cal1_pulse_cnf	Zero Padding Factor	
num_lobes_int_cal1_pulse_cnf	Number of secondary lobes to interpolate at each side in addition to the main lobe [0,4]	
k_fact_int_cal1_pulse_cnf	PTR waveform interpolation factor for the parameters retrieval	
width_avg_cal1_pulse_cnf	Width of the Running Window Averaging	s
step_avg_cal1_pulse_cnf	Time elapsed between two consecutive output records	s
num_samp_out_wfm_cal1_pulse_cnf	Number of PTR waveform samples showed in CAL1 L1B output file	
netcdf_compression_level_cal1_pulse_cnf	Compression level of the output netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	
flag_uso_delta_cal1_pulse_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
CAL2 Processor		

Field Name	*Description*	*Units*
left_avoided_samples_cal2_cnf	Number of CAL2 samples to be avoided at the left waveform edge (time domain, after FTT) for the normalization. Value without zero-padding	1
right_avoided_samples_cal2_cnf	right waveform edge (time domain, after FFT) for the normalization. Value without zero-padding	1
left_avoided_samples_cal2_frequency_cnf	Number of CAL2 samples to be avoided at the left spectrum edge (frequency domain, before FFT) for the normalisation	1
right_avoided_samples_cal2_frequency_cnf	Number of CAL2 samples to be avoided at the right spectrum edge (frequency domain, before FFT) for the normalisation	1
netcdf_compression_level_cal2_cnf	Compression level of the output netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	1
zero_pad_fact_cal2_cnf	Zero Padding Factor	1

The configuration file also includes other parameters which are used for file rankings and missing parameters needed by the algorithms. These additional parameters are described in Appendix A.

4.1.2 Poseidon-4 Characterisation Arrays file (Nominal/Redundant)

4.1.2.1 Purpose and description

The Poseidon-4 Characterisation Arrays file contains the default calibration corrections, the RMC matrix and azimuth weights and the antenna-weighting array. There are 2 files: one file for the Poseidon-4 nominal instrument and one file for the Poseidon-4 redundant instrument. The format of the files is identical.

4.1.2.2 Auxiliary Data Summary Sheet

Description	Contains the default calibration corrections, the RMC matrix and azimuth weights and the antenna-weighting array
Auxiliary Data ID	P4_1__CHAN_AX P4_1__CHAR_AX
Physical Structure	Manifest + 1 data file
Format of Data file(s)	NetCDF4
Example of Data file name(s)	AUX_CARRA_S6A_P403.nc AUX_CARRB_S6A_P403.nc
Size	150 kB

Generation Frequency	Infrequently
Validity	Entire Mission

4.1.2.3 Format

The SAFE folder for each of these data sets contains:

- Manifest xml file
- One data file (Poseidon-4 Characterisation Arrays File Nominal/Redundant) in NetCDF format

4.1.2.4 Format of Data File

The characterisation arrays file is a netCDF file. There are 2 characterisation arrays files, one for the Poseidon-4 nominal instrument and one for the Poseidon-4 redundant one. The format of the 2 files is identical.

The dimensions and the variables of the corrections files are detailed below.

Poseidon-4 Characterisation Arrays File Dimensions		
Dimension name	***Description***	***Value***
n_samples	Number of waveform samples	256
n_ku_pulses_burst	Number of Ku pulses per burst	64
n_attenuators_steps	Number of attenuator steps	47
n_antenna_weights	Number of antenna weights	480

```
netcdf AUX_CARRA_S6A_P403.nc {
dimensions:
     n_samples = 256 ;
     n_ku_pulses_burst = 64 ;
     n_attenuators_steps = 47 ;
     n_antenna_weights = 480 ;

variables:
     float cal2_mask_ku(n_samples) ;
          cal2_mask_ku:long_name = "CAL2 correction (Ku-band)" ;
          cal2_mask_ku:units = "count" ;
          cal2_mask_ku:comment = "CAL2 correction to be applied to science data. It
is obtained by normalizing and inverting the average CAL2 waveform" ;

     float cal2_mask_c(n_samples) ;
          cal2_mask_c:long_name = "CAL2 correction (C-band)" ;
          cal2_mask_c:units = "count" ;
          cal2_mask_c:comment = "CAL2 correction to be applied to science data. It
is obtained by normalizing and inverting the average CAL2 waveform" ;

     int attenuator_table_att_ku(n_attenuators_steps) ;
          attenuator_table_att_ku:long_name = "Table with the effective attenuator
gains (Ku-band)" ;
          attenuator_table_att_ku:units = "dB" ;
```

```
          attenuator_table_att_ku:scale_factor = 1.e-06;

     int attenuator_table_att_c(n_attenuators_steps) ;
          attenuator_table_att_c:long_name = "Table with the effective attenuator
gains (C-band)" ;
          attenuator_table_att_c:units = "dB" ;
          attenuator_table_att_c:scale_factor = 1.e-06;

     int attenuator_table_delay_ku(n_attenuators_steps) ;
          attenuator_table_delay_ku:long_name = "Table with the internal path
delays for each attenuator step (Ku-band)" ;
          attenuator_table_delay_ku:units = "s" ;
          attenuator_table_delay_ku:scale_factor = 1.e-15 ;

     int attenuator_table_delay_c(n_attenuators_steps) ;
          attenuator_table_delay_c:long_name = "Table with the internal path delays
for each attenuator step (C-band)" ;
          attenuator_table_delay_c:units = "s" ;
          attenuator_table_delay_c:scale_factor = 1.e-15 ;

     int burst_phase_array_corr_ku(n_ku_pulses_burst) ;
          burst_phase_array_corr_ku:long_name = "Burst phase correction (Ku-band)"
;
          burst_phase_array_corr_ku:units = "rad" ;
          burst_phase_array_corr_ku:scale_factor = 1.e-06 ;

     int burst_power_array_corr_ku(n_ku_pulses_burst) ;
          burst_power_array_corr_ku:long_name = "Burst power correction (Ku-band)"
;
          burst_power_array_corr_ku:units = "dB" ;
          burst_power_array_corr_ku:scale_factor = 1.e-06;

     short rmc_matrix_i_samples_ku(n_ku_pulses_burst, n_samples) ;
          rmc_matrix_i_samples_ku:lonng_name = "I component of the RMC matrix (Ku-
band)" ;
          rmc_matrix_i_samples_ku:units = "count" ;
          rmc_matrix_i_samples_ku:scale_factor = 3.051850947599719E-5;

     short rmc_matrix_q_samples_ku(n_ku_pulses_burst, n_samples) ;
          rmc_matrix_q_samples_ku:lonng_name = "Q component of the RMC matrix (Ku-
band)" ;
          rmc_matrix_q_samples_ku:units = "count" ;
          rmc_matrix_q_samples_ku:scale_factor = 3.051850947599719E-5 ;

     int rmc_weights_i_samples_ku(n_ku_pulses_burst) ;
          rmc_weights_i_samples_ku:long_name = "I component of the RMC weights (Ku-
band)" ;
          rmc_weights_i_samples_ku:units = "count" ;
          rmc_weights_i_samples_ku:scale_factor = 0.0001 ;

     int rmc_weights_q_samples_ku(n_ku_pulses_burst) ;
          rmc_weights_q_samples_ku:long_name = "Q component of the RMC weights (Ku-
band)" ;
          rmc_weights_q_samples_ku:units = "count" ;
          rmc_weights_q_samples_ku:scale_factor = 0.0001 ;

     double antenna_weights_ku(n_antenna_weights) ;
          antenna_weights_ku:long_name = "Antenna weights (Ku-band)" ;
          antenna_weights_ku:units = "count" ;
          antenna_weights_ku:comment = "The antenna weights are given as a function
of the pointing angle. They are applied to the stack, prior multi-looking, in order
to compensate each look for the real antenna pattern weighting. Its application
requires a good knowledge of the antenna pointing, influenced mainly by the pitch"
;
     double antenna_weights_angles_ku(n_antenna_weights) ;
```

```
          antenna_weights_angles_ku:long_name = "Angles of the Antenna weights (Ku-
band)" ;
          antenna_weights_angles_ku:units = "rad" ;
          antenna_weights_angles_ku:spacing = 8.35073068e-05 ;
          antenna_weights_angles_ku:valid_range = -0.02, 0.02 ;
          antenna_weights_angles_ku:comment = "Along track angles with respect to
the actual antenna pointing" ;
}
```

4.1.3 Poseidon-4 Weightings File

4.1.3.1 Purpose and description

The weightings file contains additional weights that are used by the HR processor. Currently, the weightings file contains 2 types of weights:

A. The azimuth FFT weights:

   The 64 weights to be applied to each waveform in the burst prior the azimuth FFT. Such weights are used to modify the azimuth impulse response in order reduce the side lobes.

B. The surface polar weights:

   The weights, characteristic of a specific surface type, to be given to each look in the stack, as a function of the look angle.

4.1.3.2 Auxiliary Data Summary Sheet

Description	Contains additional weights that are used by the HR processor
Auxiliary Data ID	P4_1__WEIG_AX
Physical Structure	Manifest + 1 data file
Format of Data file(s)	NetCDF4
Example of Data file name(s)	AUX_WEIGHT_S6A_001.nc
Size	10 kB
Generation Frequency	Infrequently
Validity	Entire Mission

4.1.3.3 Format

The SAFE folder for this data set contains:

- Manifest xml file
- One data file (Poseidon-4 Weightings file) in NetCDF format

4.1.3.4 Format of Data File

The weightings file is a NetCDF file with dimensions and variables described below.

Poseidon-4 Characterisation Arrays File Dimensions

Dimension name	*Description*	*Value*
np	Number of pulses within the burst	64
n_sp_weights	Number of weighting vectors	12

```
netcdf AUX_WEIGHT_S6A_001.nc {
dimensions:
     np = 64 ;
     n_sp_weights = 12 ;
variables:
     double azimuth_fft_weights_ku(np) ;
          azimuth_fft_weights_ku:long_name = "Azimuth FFT Weights (Ku-band)" ;
          azimuth_fft_weights_ku:units = "count" ;
          azimuth_fft_weights_ku:comment = "The 64 weights to be applied to each
waveform in the burst prior to the azimuth FFT. These weights are used to modify
the azimuth impulse response in order to reduce the side lobes" ;
     double polar_weights_ocean_ku(n_sp_weights) ;
          polar_weights_ocean_ku:long_name = "Ocean polar weights (Ku-band)" ;
          polar_weights_ocean_ku:units = "count" ;
          polar_weights_ocean_ku:comment = "The surface polar weights are given as
a function of the look angle. They are applied to the stack, prior to multi-
looking, in order to compensate each look for the surface reflectivity pattern" ;
     double polar_weights_angles_ku(n_sp_weights) ;
          polar_weights_angles_ku:long_name = "Angles associated to the surface
polar weights (Ku-band)" ;
          polar_weights_angles_ku:units = "rad" ;
          polar_weights_angles_ku:spacing = 0.285599332727273 ;
          polar_weights_angles_ku:valid_range = -1.57079633, 1.57079633 ;
          polar_weights_angles_ku:comment = "Along-track angles with respect to the
look angle." ;
}
```

4.2 Dynamic Auxiliary Files

4.2.1 Platform File

4.2.1.1 Purpose and description

This file contains 1589 values of:

1. the nadir projection of the distance between the altimeter antenna centre of phase and the satellite centre of gravity;
2. the platform derived off nadir pitch, roll and yaw angles;
3. the P4 antenna derived off nadir pitch, roll and yaw angles;
4. a quality flag indicating the quality status of the product (i.e. nominal or degraded).

Each platform file covers approximately 26 hours and contains 1589 records at step of one minute along the orbit.
The platform file will account to any mispointing biases measured during commissioning; this has never been needed in other missions, but CNES confirmed that it will be done, if needed.

4.2.1.2 Auxiliary Data Summary Sheet

Description	platform derived information
Auxiliary Data ID	P4_1__PTFA_AX
Physical Structure	Manifest + 1 data file
Format of Data file (s)	XML
Example of Data file name(s) *GFNC compliant, i.e. the three dates in the examples are: ValidityStartTime_ValidityStop Time_ GenerationTime)*	S6A_P4_1__PTFA_AX_20180617T215923_20180619T020023_20180619T075500_ _____SALP_OPE_SN____.EOF S6B_P4_1__PTFA_AX_20180617T215923_20180619T020023_20180619T075500_ _____SALP_OPE_SN____.EOF
Size	1.3 MB
Generation Frequency	Daily (once a day the file is sent by SALP no later than 0900z)
Validity	Approximately 28 hours from ~ D-2/2200z-D/0200z (D = processing/generation day)

4.2.1.3 Format

The SAFE folder for this data set contains:

- Manifest xml file
- One data file (.EOF) in xml with both Header and a Datablock section.

4.2.1.4 Format of the Platform Data File

The original data file consists of a single file (*.EOF) containing both the Header and the Datablock sections.

The data block format is ASCII XML presenting an unlimited number of "PTF"'s elements, under the "List_of_PTFs" tag. The structure is reported below, based on S-3 files, tailored for Jason-CS Mission. An example file from S-3 Mission is also provided.

The detailed format is specified in [AD- 6].

Table 4-2: Platform File Data Block

Tag Name	*Type*	*Unit*	*Description*
TAI	date		TAI date and time of PTF Values, in ASCII standard time format, including time reference and micro-seconds. TAI=yyyy-mm-ddThh:mm:ss.ssssss
UTC	date		UTC date and time of PTF Values, in ASCII standard time format, including time reference and microseconds. UTC=yyyy-mm-ddThh:mm:ss.ssssss

UT1	date		UT1 date and time of PTF Values, in ASCII standard time format, including time reference and microseconds. UT1=yyyy-mm-ddThh:mm:ss.ssssss
Platform_Off_Nadir_Pitch_Angle	float	degree	Platform Mis-pointing Pitch Angle
Platform_Off_Nadir_Roll _Angle	float	degree	Platform Mis-pointing Roll Angle
Platform_Off_Nadir_Yaw _Angle	float	degree	Platform Mis-pointing Yaw Angle
P4_Off_Nadir_Pitch_Angle	float	degree	Altimeter (P4) Antenna Mis-pointing Pitch Angle
P4_Off_Nadir_Roll_Angle	float	degree	Altimeter (P4) Antenna Mis-pointing Roll Angle
P4_Off_Nadir_Yaw_Angle	float	degree	Altimeter (P4) Antenna Mis-pointing Yaw Angle
Dist_Ant_COG	float	meter	Distance between the antenna phase centre and the centre of gravity of the satellite (nadir projection)
Quality	String		Quality flag indicating the quality status of the product (i.e., nominal, degraded)

4.2.1.5 Example file (Sentinel 6)

```
<?xml version="1.0" ?>
<Earth_Explorer_File>
<Earth_Explorer_Header Schema_Server_Url="http://earth.esa.int/sentinel6/xml">
<Fixed_Header>
<File_Name>S6A_P4_1__PTFA_AX_20180617T215923_20180619T020023_20200622T102739_______
___________SALP_VAL_SN____.EOF</File_Name>
<File_Description>Preliminary Platform file</File_Description>
<Notes></Notes>
<Mission>Sentinel-6A</Mission>
<File_Class>OPER</File_Class>
<File_Type>P4_1__PTFA_AX</File_Type>
<Validity_Period>
<Validity_Start>UTC=2018-06-17T21:59:23</Validity_Start>
<Validity_Stop>UTC=2018-06-19T02:00:23</Validity_Stop>
</Validity_Period>
<File_Version>___</File_Version>
<Source>
<System>SSALTO</System>
<Creator>O_M</Creator>
<Creator_Version>1.4.1</Creator_Version>
<Creation_Date>UTC=2020-06-22T10:27:39</Creation_Date>
</Source>
</Fixed_Header>
<Variable_Header>
</Variable_Header>
</Earth_Explorer_Header>
<Data_Block type="xml">
    <List_of_PTFs count="1682">
       <PTF>
         <TAI>TAI=2018-06-17T22:00:00.000000</TAI>
         <UTC>UTC=2018-06-17T21:59:23.000000</UTC>
         <UT1>UT1=2018-06-17T21:59:22.835693</UT1>
         <Platform_Off_Nadir_Pitch_Angle>0.000</Platform_Off_Nadir_Pitch_Angle>
         <Platform_Off_Nadir_Roll_Angle>0.000</Platform_Off_Nadir_Roll_Angle>
         <Platform_Off_Nadir_Yaw_Angle>0.000</Platform_Off_Nadir_Yaw_Angle>
         <P4_Off_Nadir_Pitch_Angle>0.000</P4_Off_Nadir_Pitch_Angle>
```

```
        <P4_Off_Nadir_Roll_Angle>0.000</P4_Off_Nadir_Roll_Angle>
        <P4_Off_Nadir_Yaw_Angle>0.000</P4_Off_Nadir_Yaw_Angle>
        <Dist_Ant_COG>0.6665</Dist_Ant_COG>
        <Quality>NOMINAL</Quality>
      </PTF>
      <PTF>
        <TAI>TAI=2018-06-17T22:01:00.000000</TAI>
        <UTC>UTC=2018-06-17T22:00:23.000000</UTC>
        <UT1>UT1=2018-06-17T22:00:22.835693</UT1>
        <Platform_Off_Nadir_Pitch_Angle>0.000</Platform_Off_Nadir_Pitch_Angle>
        <Platform_Off_Nadir_Roll_Angle>0.000</Platform_Off_Nadir_Roll_Angle>
        <Platform_Off_Nadir_Yaw_Angle>0.000</Platform_Off_Nadir_Yaw_Angle>
        <P4_Off_Nadir_Pitch_Angle>0.000</P4_Off_Nadir_Pitch_Angle>
        <P4_Off_Nadir_Roll_Angle>0.000</P4_Off_Nadir_Roll_Angle>
        <P4_Off_Nadir_Yaw_Angle>0.000</P4_Off_Nadir_Yaw_Angle>
        <Dist_Ant_COG>0.6665</Dist_Ant_COG>
        <Quality>NOMINAL</Quality>
      </PTF>
      <PTF>
        <TAI>TAI=2018-06-17T22:02:00.000000</TAI>
        <UTC>UTC=2018-06-17T22:01:23.000000</UTC>
        <UT1>UT1=2018-06-17T22:01:22.835693</UT1>
        <Platform_Off_Nadir_Pitch_Angle>0.000</Platform_Off_Nadir_Pitch_Angle>
        <Platform_Off_Nadir_Roll_Angle>0.000</Platform_Off_Nadir_Roll_Angle>
        <Platform_Off_Nadir_Yaw_Angle>0.000</Platform_Off_Nadir_Yaw_Angle>
        <P4_Off_Nadir_Pitch_Angle>0.000</P4_Off_Nadir_Pitch_Angle>
        <P4_Off_Nadir_Roll_Angle>0.000</P4_Off_Nadir_Roll_Angle>
        <P4_Off_Nadir_Yaw_Angle>0.000</P4_Off_Nadir_Yaw_Angle>
        <Dist_Ant_COG>0.6665</Dist_Ant_COG>
        <Quality>NOMINAL</Quality>
      </PTF>
…
</List_of_PTFs>
 </Data_Block>
</Earth_Explorer_File>
```

4.2.2 DORIS USO Drift File

4.2.2.1 Purpose and description

The USO Drift file contains the measured drift of the USO from its nominal clock (10 MHz). It provides with the long-term monitoring of the on-board DORIS USO frequency and it is used to correct the DORIS datation measurement and the altimeter range measurement.

One DORIS USO drift file is generated and transferred by SALP every day in the nominal routine case.

This file is a by-product of the operational preliminary ephemeris processing of SALP. So it is generated with the same delay than the STC ephemeris (MOE orbit files), described in [AD-1].

Each DORIS USO drift file covers the time elapsed since the beginning of the mission. This file is updated incrementally. Every day the previous version of the file is being upgraded with new records corresponding to master beacons over flights.

4.2.2.2 Auxiliary Data Summary Sheet

Description	This file contains DORIS USO drift information.
Auxiliary Data ID	P4_1__USO__AX

Physical Structure	Manifest + 1 data file
Format of Data file (s)	ASCII
Example of Data file name(s) *GFNC compliant, i.e. the three dates in the examples are: ValidityStartTime_ValidityStopTime_ GenerationTime)*	S6A_P4_1__USO__AX_20180501T144459_20190108T014531_20190108T090449449_____SALP_OPE_____.DBL S6B_P4_1__USO__AX_20180501T144459_20190108T014531_20190108T090449_____SALP_OPE_____.DBL
Size	< 1 MB (each DORIS USO drift file is n*65 bytes longer than the file received the day before (n is up to 7, depending on the number of master beacons available).
Generation Frequency	Daily
Validity	From BOM to day D-1

4.2.2.3 Format

The SAFE folder for this data set contains:

- Manifest xml file
- One ASCII data file (*.DBL)

4.2.2.4 Format of USO drift file

The USO Drift data file consists in one Data Block (.DBL) in ASCII format, which includes:

- a header of 2945 bytes;
- a data block composed of N records of DORIS USO data records.

This file is an historical file since the start of the relevant Doris chain.

An example of the ASCII Data Block file is provided below.
The detailed format is specified in [AD- 6].

4.2.2.5 Example file (Sentinel-6)

```
PRODUCT="S6A_P4_1__USO__AX_20160119T113455_20170306T031933_20170306T082900_________
_________SALP_OPE_AL____.DBL "
PROC_STAGE=X
REF_DOC="                          "

ACQUISITION_STATION="ORBITE MISSION      "
PROC_CENTER="O_M    "
PROC_TIME="06-MAR-2017 08:29:00.000000"
SOFTWARE_VER="orbito/4.6     "

SENSING_START="19-JAN-2016 11:34:55.000000"
SENSING_STOP="06-MAR-2017 03:19:33.000000"

PHASE=X
CYCLE=+000
REL_ORBIT=+00000
ABS_ORBIT=+00000
STATE_VECTOR_TIME="                              "
```

```
DELTA_UT1=+.000000<s>
X_POSITION=+0000000.000<m>
Y_POSITION=+0000000.000<m>
Z_POSITION=+0000000.000<m>
X_VELOCITY=+0000.000000<m/s>
Y_VELOCITY=+0000.000000<m/s>
Z_VELOCITY=+0000.000000<m/s>
VECTOR_SOURCE="  "

UTC_SBT_TIME="                              "
SAT_BINARY_TIME=+0000000000
CLOCK_STEP=+0000000000<ps>

LEAP_UTC="                              "
LEAP_SIGN=+000
LEAP_ERR=0

PRODUCT_ERR=0
TOT_SIZE=+00000000000000460635<bytes>
SPH_SIZE=+0000000658<bytes>
NUM_DSD=+0000000002
DSD_SIZE=+0000000280<bytes>
NUM_DATA_SETS=+0000000002

SPH_DESCRIPTOR="DERIVES OUS BORD             "

DS_NAME="          ENTETES           "
DS_TYPE=G
FILENAME="NOT USED                                                          "
DS_OFFSET=+00000000000000001905<bytes>
DS_SIZE=+00000000000000001000<bytes>
NUM_DSR=+0000000005
DSR_SIZE=+0000000200<bytes>

DS_NAME="APPOINTS FREQUENCE          "
DS_TYPE=G
FILENAME="NOT USED                                                          "
DS_OFFSET=+00000000000000002905<bytes>
DS_SIZE=+00000000000000457730<bytes>
NUM_DSR=+0000007042
DSR_SIZE=+0000000065<bytes>

###############################################################################
###############################################################################
###################################
# FICHIER D'ECARTS DE FREQUENCE DE L'OUS BORD: JMES, SMES, DELTAF_MES, DELTAF_MOD,
RESIDU, IND
# (JMES, SMES): Date TAI de la mesure en jours julien 1950 et secondes, DELTAF_MES:
appoint en frequence/frequence nominale mesure,
# DELTAF_MOD: appoint en frequence/frequence nominale modelise, RESIDU = DELTAF_MES
- DELTAF_MOD, IND: Indicateur de validite (1 si oui)
###############################################################################
###############################################################################
###################################
2412441731.200002     0.01532512     0.01533237    -0.00000725 1
2412448911.040002     0.01538328     0.01542850    -0.00004522 1
2412455866.240002     0.01548459     0.01552192    -0.00003733 1
24125  501.120002     0.01597736     0.01594184     0.00003551 1
24125  501.120002     0.01599999     0.01594184     0.00005814 1
24125  501.120002     0.01598586     0.01594184     0.00004402 1
24125 6704.640002     0.01601497     0.01602630    -0.00001133 1
24125 6704.640002     0.01596023     0.01602630    -0.00006607 1
24125 6704.640002     0.01595729     0.01602630    -0.00006900 1
…
```

4.2.3 Poseidon-4 Long Term Monitoring (LTM) files

4.2.3.1 Purpose and description

There are four different LTM files including the output of different calibration chains within the L1 calibration processor; each of these four files is initialised with a record built from pre-launch measurements. During the mission life, new records are added as soon as new measurements are performed and processed.

- CAL1 HR (output of the CAL1 SAR processor) contains corrections for intra-burst amplitude and phase variation for Ku-band. It also contains corrections for path delay and peak/integrated power variations for Ku- and C-band.
- CAL1 LR (output of the CAL1 LRM processor) contains corrections for path delay and peak/integrated power variations for Ku- and C-band
- CAL1 ECHO CAL (output of the Pulse Cal processor) contains corrections for path delay and peak/integrated power variations along the orbit for Ku-band only.
- CAL2 (output of the CAL2 processor) contains the instrument transfer function for Ku- and C-band.

4.2.3.2 Auxiliary Data Summary Sheet

Description	Long Term Monitoring Calibration Files: 4 files
Auxiliary Data ID	P4_1__C1HR_AX P4_1__C1LR_AX P4_1__ECHO_AX P4_1__CAL2_AX
Physical Structure	Manifest + 1 data file
Format of Data file (s)	NetCDF4
Example of Data file name(s)	P4_1__C1HR_AX.nc P4_1__C1LR_AX.nc P4_1__ECHO_AX.nc P4_1__CAL2_AX.nc
Size	detailed sizes are provided in AD-7, work sheet S6_JCS_CAL1
Generation Frequency	The generation frequency of the LTM files is related to the frequency of the different calibration modes.
Validity	Historical file: valid from the beginning of the mission until the time of the last calibration sequence included

4.2.3.3 Format

The SAFE folder for each of these data sets contains:

- Manifest xml file
- One data file (LTM) in NetCDF format

4.2.3.4 Format of LTM NetCDF files

A complete list of the NetCDF variables and their associated attributes is provided as an Excel spreadsheet in the applicable document [AD- 7], Sentinel-6/Jason-CS ALT Level 1 NetCDF Dump.

All variables defined in the applicable document referred above within the work sheet S6_JCS_CAL1 shall be included in the in the CAL1 and ECHO CAL LTM files, other than the PTR waveform (excluded variables are cal1_power_waveform and waveform_scale_factor), and also exclude dimension and variable “samples”.

All variables defined in the applicable document referred above within the work sheet S6_JCS_CAL2 are included in the CAL2 LTM file.

The following variables are defined as arrays in the LTMs:

- processing_configuration_flags -- CAL1 LR L1, CAL1 HR L1 and ECHO CAL L1
- range_oversampling_factor -- CAL1 LR L1, CAL1 HR L1, ECHO CAL L1 and CAL2

In the LTMs the time dimension is included as the history of each variable is considered. This is not the case in the NetCDF Dump file.

NOTE: the CAL1 ECHO CAL (Pulse) LTM file does not contain C-band**.**

APPENDIX A NEW CONFIGURATION FIELDS IN THE CONFIGURATION FILE

Field Name	*Description*	*Units*
	General	
filelog_level_cnf	Level (or higher) of the filelog logs: TRACE (0); DEBUG (1); INFO (2); WARN (3); ERROR (4); CRITICAL (5); OFF (6)	flag
syslog_level_cnf	Level (or higher) of the syslog logs: TRACE (0); DEBUG (1); INFO (2); WARN (3); ERROR (4); CRITICAL (5); OFF (6)	flag
navatt_orbit_filename_cnf	Name of the NAVATT orbit file	
navatt_attitude_filename_cnf	Name of the NAVATT attitude file	
manifest_alt_nom_schema_path_cnf	Manifest ALT nominal schema path	
manifest_alt_cal_schema_path_cnf	Manifest ALT CAL schema path	
manifest_adf_ltm_schema_path_cnf	Manifest ADF LTM schema path	
flag_manifest_validation_mandatory_cnf	Flag that sets the manifest correct validation as mandatory: Not mandatory (0); Mandatory (1)	flag
	LR Processor	
flag_uso_delta_lr_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
flag_cor2_selection_lr_cnf	lag indicating the source of the COR2: Telemetry (0); POD service (1)	flag
path_delay_source_ku_lr_cnf	Source file for the Path Delay correction (Ku-band). Product type options: ECHO CAL LTM (P4_1__ECHO_AX) / CAL1 HR LTM (P4_1__C1HR_AX) / CAL1 LR LTM (P4_1__C1LR_AX) / Characterisation (P4____CHDN_AX). Note: only CHDN is indicated in the list, but both Nominal/Redundant are considered	
path_delay_source_c_lr_cnf	Source file for the Path Delay correction (C-band). Product type options: CAL1 HR LTM (P4_1__C1HR_AX) / CAL1 LR LTM (P4_1__C1LR_AX) / Characterisation (P4____CHDN_AX). Note: only CHDN is indicated in the list, but both Nominal/Redundant are considered	
power_variation_source_ku_lr_cnf	Source file for the Power Variation correction (Ku-band). Product type options: ECHO CAL LTM (P4_1__ECHO_AX) / CAL1 HR LTM (P4_1__C1HR_AX) / CAL1 LR LTM (P4_1__C1LR_AX) / Characterisation (P4____CHDN_AX). Note: only CHDN is indicated in the list, but both Nominal/Redundant are considered	
power_variation_source_c_lr_cnf	Source file for the Power Variation correction (C-band). Product type options: CAL1 HR LTM (P4_1__C1HR_AX) / CAL1 LR LTM (P4_1__C1LR_AX) / Characterisation (P4____CHDN_AX). Note: only CHDN is indicated in the list, but both Nominal/Redundant are considered	
cal2_source_lr_cnf	Source file for the CAL2 correction (both Ku-band and C-band). Product type options: CAL2 LTM (P4_1__CAL2_AX) / Characterisation Arrays (P4_1__CHAN_AX). Note: only CHAN is indicated in the list, but both Nominal/Redundant are considered	
footprint_time_step_lr_cnf	Time step between two consecutive points of the footprint that will be written in the manifest file	s
footprint_delta_lat_lon_lr_cnf	Delta in lat/lon applied perpendicularly to the flight direction, in order to have the footprint with a width	degree
min_duration_lr_nrt_cnf	Minimum LR data duration for NRT	s

Field Name	Description	Units
HR Processor		
l1a_padding_hr_cnf	Extra padding of the ALT L1A input products with respect to the ALT L1B output product	s
flag_uso_delta_hr_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
flag_cor2_selection_hr_cnf	Flag indicating the source of the COR2: Telemetry (0); POD service (1)	flag
path_delay_source_hr_cnf	Source file for the Path Delay correction (Ku-band). Product type options: ECHO CAL LTM (P4_1__ECHO_AX) / CAL1 HR LTM (P4_1__C1HR_AX) / CAL1 LR LTM (P4_1__C1LR_AX) / Characterisation (P4____CHDN_AX). Note: only CHDN is indicated in the list, but Nominal/Redundant are considered	
power_variation_source_hr_cnf	Source file for the Power Variation correction (Ku-band). Product type options: ECHO CAL LTM (P4_1__ECHO_AX) / CAL1 HR LTM (P4_1__C1HR_AX) / CAL1 LR LTM (P4_1__C1LR_AX) / Characterisation (P4____CHDN_AX). Note: only CHDN is indicated in the list, but both Nominal/Redundant are considered	
intra_burst_source_hr_cnf	Source file for the Intra-burst correction (Ku-Band). Product type options: CAL1 HR LTM (P4_1__C1HR_AX) / Characterisation Arrays (P4_1__CHAN_AX). Note: only CHAN is indicated in the list, but both Nominal/Redundant are considered	
cal2_source_hr_cnf	Source file for the CAL2 correction (both Ku-band and C-band). Product type options: CAL2 LTM (P4_1__CAL2_AX) / Characterisation Arrays (P4_1__CHAN_AX). Note: only CHAN is indicated in the list, but both Nominal/Redundant are considered	
n_threads_hr_nrt_cnf	Number of threads to be used in the inner parallelisation of the HR processing chain in NRT timeline, from 1 (no parallelisation) to 4	
n_threads_hr_stc_cnf	Number of threads to be used in the inner parallelisation of the HR processing chain in STC timeline, from 1 (no parallelisation) to 4	
n_threads_hr_ntc_cnf	Number of threads to be used in the inner parallelisation of the HR processing chain in NTC timeline, from 1 (no parallelisation) to 4	
footprint_time_step_hr_cnf	Time step between two consecutive points of the footprint that will be written in the manifest file	s
footprint_delta_lat_lon_hr_cnf	Delta in lat/lon applied perpendicularly to the flight direction, in order to have the footprint with a width	degree
min_granule_duration_hr_nrt_cnf	Minimum granule duration for NRT	s
CAL1 LR Processor		
flag_uso_delta_cal1_lrm_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
cal2_source_cal1_lr_cnf	Source file for the CAL2 correction (both Ku-band and C-band). Product type options: CAL2 LTM (P4_1__CAL2_AX) / Characterisation Arrays (P4_1__CHAN_AX). Note: only CHAN is indicated in the list, but both Nominal/Redundant are considered	
CAL1 HR Processor		
flag_uso_delta_cal1_sar_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag

Field Name	Description	Units
cal2_source_cal1_hr_cnf	Source file for the CAL2 correction (both Ku-band and C-band). Product type options: CAL2 LTM (P4_1__CAL2_AX) / Characterisation Arrays (P4_1__CHAN_AX). Note: only CHAN is indicated in the list, but both Nominal/Redundant are considered	
Echo CAL Processor		
flag_uso_delta_cal1_pulse_cnf	Flag indicating which USO delta shall be used: DELTAF_MOD (0); DELTAF_MEAS (1)	flag
cal2_source_cal1_pulse_cnf	Source file for the CAL2 correction. Product type options: CAL2 LTM (P4_1__CAL2_AX) / Characterisation Arrays (P4_1__CHAN_AX). Note: only CHAN is indicated in the list, but both Nominal/Redundant are considered	
flag_smoothing_cal1_pulse_cnf	Flag to activate the smoothing of the ECHO CAL parameters, using averaging windows that are defined by the parameters width_avg_cal1_pulse_cnf and step_avg_cal1_pulse_cnf	flag
footprint_time_step_cal1_pulse_cnf	Time step between two consecutive points of the footprint that will be written in the manifest file	s
footprint_delta_lat_lon_cal1_pulse_cnf	Delta in lat/lon applied perpendicularly to the flight direction, in order to have the footprint with a width	degree
Acquisition Monitoring Processor		
footprint_time_step_acq_mon_cnf	Time step between two consecutive points of the footprint that will be written in the manifest file	s
footprint_delta_lat_lon_acq_mon_cnf	Delta in lat/lon applied perpendicularly to the flight direction, in order to have the footprint with a width	degree
netcdf_compression_level_acq_mon_cnf	Compression level of the output netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	
Rankings NRT Mode		
orbit_ranking_nrt_cnf	Orbit state vector ranking in NRT mode (mandatory). Product type of: DOR_NAV/ROE/RESO/NAVATT/PREO	
orbit_left_margin_nrt_cnf	Tolerance in the selection of the orbit file in NRT, subtracted to the file start time	s
orbit_right_margin_nrt_cnf	Tolerance in the selection of the orbit file in NRT, added to the file stop time	s
attitude_ranking_nrt_cnf	Attitude ranking in NRT mode (optional). Product type of: NAVATT	
com_ranking_nrt_cnf	CoM ranking in NRT mode (mandatory). Product type of: SMR/CHD (note: only CHDN is indicated in the list, but both Nominal/Redundant are considered)	
time_init_ranking_nrt_cnf	Time initialisation ranking in NRT mode (mandatory). Product type of: ROE/RESO/PREO	
manoeuvre_ranking_nrt_cnf	Manoeuvre ranking in NTC mode (optional). Product type of: NAVATT/MHF	
Rankings STC Mode		
orbit_time_init_ranking_stc_cnf	Orbit state vector and time initialisation ranking in STC mode (mandatory). Product type of: MOED/MOEG	
attitude_ranking_stc_cnf	Attitude ranking in STC mode (mandatory). Product type of: Platform	
com_ranking_stc_cnf	CoM ranking in STC mode (mandatory). Product type of: Platform/SMR/CHD (note: only CHDN is indicated in the list, but both Nominal/Redundant are considered)	
manoeuvre_ranking_stc_cnf	Manoeuvre ranking in NTC mode (optional). Product type of: NAVATT/MHF	
Rankings NTC Mode		

Field Name	Description	Units
orbit_time_init_ranking_ntc_cnf	Orbit state vector and time initialisation ranking in NTC mode (mandatory). Product type of: POE	
attitude_ranking_ntc_cnf	Attitude ranking in NTC mode (mandatory). Product type of: Platform	
com_ranking_ntc_cnf	CoM ranking in NTC mode (mandatory). Product type of: Platform	
manoeuvre_ranking_ntc_cnf	Manoeuvre ranking in NTC mode (optional). Product type of: NAVATT/MHF	
Correction Sources Windows		
cal1_lr_avg_win_left_width_ku_cnf	Left width of the average window used on the CAL1 LR file, which is centered in the closest file time (Ku-band)	s
cal1_lr_avg_win_right_width_ku_cnf	Right width of the average window used on the CAL1 LR file, which is centered in the closest file time (Ku-band)	s
cal1_lr_avg_win_left_width_c_cnf	Left width of the average window used on the CAL1 LR file, which is centered in the closest file time (C-band)	s
cal1_lr_avg_win_right_width_c_cnf	Right width of the average window used on the CAL1 LR file, which is centered in the closest file time (C-band)	s
cal1_hr_avg_win_left_width_ku_cnf	Left width of the average window used on the CAL1 HR file, which is centered in the closest file time (Ku-band)	s
cal1_hr_avg_win_right_width_ku_cnf	Right width of the average window used on the CAL1 HR file, which is centered in the closest file time (Ku-band)	s
cal1_hr_avg_win_left_width_c_cnf	Left width of the average window used on the CAL1 HR file, which is centered in the closest file time (C-band)	s
cal1_hr_avg_win_right_width_c_cnf	Right width of the average window used on the CAL1 HR file, which is centered in the closest file time (C-band)	s
echo_cal_avg_win_left_width_ku_cnf	Left width of the average window used on the Echo CAL file, which is centered in the closest file time (Ku-band)	s
echo_cal_avg_win_right_width_ku_cnf	Right width of the average window used on the Echo CAL file, which is centered in the closest file time (Ku-band)	s
cal2_avg_win_left_width_ku_cnf	Left width of the average window used on the CAL2 file, which is centered in the closest file time (Ku-band)	s
cal2_avg_win_right_width_ku_cnf	Right width of the average window used on the CAL2 file, which is centered in the closest file time (Ku-band)	s
cal2_avg_win_left_width_c_cnf	Left width of the average window used on the CAL2 file, which is centered in the closest file time (C-band)	s
cal2_avg_win_right_width_c_cnf	Right width of the average window used on the CAL2 file, which is centered in the closest file time (C-band)	s
Global attributes		
convention_global_att_cnf	Name of the conventions followed by the dataset	
institution_global_att_cnf	Specifies where the original data was produced	
references_global_att_cnf	Published or web-based references that describe the data or methods used to produce it.	
contact_global_att_cnf	Contact global attribute value	
radiometer_global_att_cnf	Radiometer global attribute value	
doris_global_att_cnf	DORIS global attribute value	
gnss_global_att_cnf	GNSS global attribute value	
L1A variables		
Configuration of L1A variables names and attributes as defined in [L1 NC Dump], tab S6_JCS_HR_L1A.		
L1B variables		

Field Name	Description	Units
Configuration of L1A variables names and attributes as defined in [L1 NC Dump], tab S6_JCS_LR_HR_L1B.		
L1 CAL1 variables		
Configuration of L1A variables names and attributes as defined in [L1 NC Dump], tab S6_JCS_CAL1.		
L1 CAL2 variables		
Configuration of L1A variables names and attributes as defined in [L1 NC Dump], tab S6_JCS_CAL2.		
L1 ACQ MON variables		
Configuration of L1A variables names and attributes as defined in [L1 NC Dump], tab S6_JCS_ACQ.		