



Project
EPS-SG Local Processors
Re-engineering Processor Prototypes

EPS-SG MWS L1b LP Interface Control
Document
L1b_LP-ID-ISARD-EPS_SG-0206

isardSAT Ref.:	ISARD_EUM_EPS-SG-L1b_MWS_ICD_1207
Version:	4.1
Date:	28/02/2025
Author:	isardSAT Team

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Configuration Control

Title: EPS-SG MWS L1b LP Interface Control Document
Created by: isardSAT Team
Editing Tool: Microsoft WORD

Document Change Record

Version	Date	Author/Revision	Reason for Change	Changed Sections/Pages
1.0	19/10/2022	isardSAT Team	First Issue	-
2.0	20/02/2023	isardSAT Team	Remove CSAR date and version RCP#1 RID-MWS-3 & RID-MWS-4 Rename L0AUXILIARY into L0ADDITIONAL Update Open Points table Gather all the LP auxiliary configuration files inside the CCDB Preliminary description of the Job Order, Task Table and LP configuration customizations, solving OP-2 to OP-7	§2.1 §4, §5.3 §2.4 §5.4.3 Appendix A, Appendix B, Appendix C
3.0	12/12/2023	isardSAT Team	Update purpose for document 3 rd release Clarify responsibilities Add SUM as RD Remove ACS acronym Remove Open Points table, all OP are closed Clarify processor overview Move the description of IF_PF_MWSL1_L1Context (I/O) before the one of IF_MWSL1_PF_L1Products DR#1 RID#66: Update source and target's name DR#1 RID#56: Update Data Element Item for sake of consistency with the SDD DR#1 RID#63: Replace Report by Log	§1.2 §1.3 §2.2 §2.3 §2.4 §3 §5 §5.X.1 §5.X.3 §4, §5.4

Version	Date	Author/Revision	Reason for Change	Changed Sections/Pages
			DR#1 RID#8 / 57 / 58 / 63 / 65: Description of the Job Order, Task Table and LP configuration customizations and Error Codes, solving OP-9 to OP-10 and OP-11	§5.7.3, Appendix A, Appendix B, Appendix C, Appendix D.
			DR#1 RID#64: Update the Local Layout description, referring to [MWS-SUM], solving OP-1	§6
4.0	10/12/2024	isardSAT Team	Version for MWS V2 TRR2#1. Move the Local Processor Configuration files to the new AUX_CNF package. Add new configuration parameters: n_threads, validate_inputs_flag and l1b_free_text.	§5.4.3, Appendix A, Appendix B, Appendix C. Appendix C.
4.1	28/02/2025	isardSAT Team	Version for MWS V2 AR2#1 TRR2#1 RID #1: Align file types with the specifications TRR2#1 RID #5: Clarify AUX_POFD time step TRR2#1 RID #6: Solve broken link TRR2#1 RID #7: Indicate MWS-RAD-1B NetCDF-4 format TRR2#1 RID #8: Change the File_Name_Type used for the output files from Directory to Stem, in the Task table example TRR2#1 RID #3: Correct the page numbering	§5.2.3, §5.3.3, §5.4.3, §5.5.3, §5.6.3, Appendix A and B. §5.4.3 §5.5.1 §5.6.3 Appendix B. Appendix C.

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1. Introduction

This document, the MWS L1b LP Interface Control Document describes the interfaces of the **MWS L1b LP** SW component, which is part of the Re-engineering of the EPS-SG Processor Prototypes project.

1.1. DRD

It is based on Annex B of ECSS-E-ST-10-24C and on learned lesson on Interface Control Documents EUM perspective.

1.2. Purpose and Objective

The purpose of this ICD is to describe how **MWS L1b LP** SW component interacts with other external SW sub-systems (e.g. Processing Framework) or external actors.

This document is based on the main outcomes from the Review of the Applicable Documentation, Prototype Code Inspection and Analysis (WP 1310), which are provided in the following technical notes:

- The critical analysis of the L1b LP requirements provided in [RBA].
- The critical analysis of the MWS L1b Applicable Baseline documentation, provided in [MWS-TN1].
- The critical analysis of the MWS L1b Performance Requirement, provided in [MWS-TN2].
- The re-design and optimisation proposal provided in [MWS-TN3].
- The identification of the MWS L1b Implementation Gaps, provided in [MWS-TN4].

The document does not cover any internal interface at SW sub-system level.

1.3. Responsibility

For what concern the MWS L1b LP sub-system the following responsibilities have been identified:

- isardSAT is responsible for managing all the interfaces contained inside of this ICD.
- Exprivia and isardSAT are the ends responsible for all the interfaces defined in this ICD.
- EUMETSAT is responsible for the ICDs applicable to this ICD and under the direct responsibility of EUM.
- EUMETSAT is the final authority approval of all the interfaces defined in this ICD.

2. Applicable and Reference Documents

2.1. Applicable Documents

Document Name	Document Identifier	Internal Reference
Statement of Work for re-engineering EPS-SG Local Mission L1 Processor	EUM/LEO-EPSSG/SOW/21/1225668 V1, 26 October 2021	[SOW]
Technical and Management Proposal (Part One) and its Annexes	L1b_LP-OF-XPR-EPS_SG-0011	[Part One]
Contractual & Financial Proposal (Part Two) and its Annexes	L1b_LP-OF-XPR-EPS_SG-0012	[Part Two]
EPS-SG Local Mission L1 Processor Technical Requirements	EUM/LEO-EPSSG/REQ/21/1227040 v1 e-signed, 30 September 2021	[L1-AD]
EPS-SG Generic Auxiliary Data Specification	EUM/LEO-EPSSG/SPE/13/718291	[GADS]
EPS-SG Generic Product Format Specification (GPFS)	EUM/LEO-EPSSG/SPE/13/702108	[GPFS]
EPS-SG Level 0 Product Format Specification	EUM/LEO-EPSSG/SPE/13/70392	[L0-PFS]
EPS-SG MWS Level 1B Auxiliary Data Specification (ADS)	EUM/LEO-EPSSG/SPE/14/777588	[MWS-L1B-ADS]
EPS-SG MWS Level 1B Product Format Specification (PFS)	EUM/LEO-EPSSG/SPE/14/777550	[MWS-L1B-PFS]
EPS-SG MWS Level 1B Product Generation Specification (PGS)	EUM/LEO-EPSSG/SPE/14/777476	[MWS-L1B-PGS]
EPS-SG SAT-A Image Navigation and Registration (INR) Specifications	EUM/LEO-EPSSG/SPE/15/814371	[INR-SPEC-SATA]
Configuration Status Accounting Report	L1b_LP-RP-XPR-EPS_SG-0102	[CSAR]

2.2. Reference Documents

Document Name	Document Identifier	Internal Reference
EPS-SG Mission Conventions and Standards Document	EUM/LEO-EPSSG/STD/14/745221	[MCSD]
EPS-SG MWS Level 1 OP Reference Test Data Package Description	EUM/LEO-EPSSG/DOC/19/1062372	[MWS-L1B-TDPD]
Computer Hardware, Operating System and COTS Products Reference Guide	EUM/OPS/TEN/07/2373	[COTS]
MWS L1B Processor Prototype SW packages	/	[MWS-L1B-IPP]
EPS-SG LP Requirements Baseline Analysis	L1b_LP-TN-XPR-EPS_SG-0103	[RBA]
TN1 EPS-SG MWS L1b Local Processor Applicable Documentation Analysis	L1b_LP-TN-ISARD-EPS_SG-0202	[MWS-TN1]

Document Name	Document Identifier	Internal Reference
TN2 EPS-SG MWS L1b Local Processor Analysis of Performance Requirements	L1b_LP-TN-ISARD-EPS_SG-0203	[MWS-TN2]
TN3 MWS EPS-SG Local Processor re-design and Optimisation Proposal	L1b_LP-TN-ISARD-EPS_SG-0204	[MWS-TN3]
TN4 EPS-SG MWS L1b Local Processor Identification of Implementation Gaps	L1b_LP-TN-ISARD-EPS_SG-0205	[MWS-TN4]
EPS-SG MWS L1b Local Processor Software User Manual	L1b_LP-MA-ISARD-EPS_SG-0209	[MWS-SUM]

2.3. Acronyms

Terms, Definitions and Abbreviated Terms

APT	Anomaly Processing Tool
AR	Acceptance Review
ARB	Anomalies Review Board
BPMN	Business Process Model Notation
BRC	Basic Repeat Cycle
CEFR	Common European Framework of Reference for Languages
DBA	Direct Broadcast Acquisition
CFI	Customer Furnished Item
COTS	Commercial Off-the-Shelf
DFDA	Digital Factory Aerospace & Defence
EO	Earth Observation
EPS-SG	EUMETSAT Polar System-Second Generation
FOV	Field-Of-View
HW	HardWare
ICI	Ice Cloud Imaging
ICD	Interface Control Document
IPR	Intellectual Property Right
KOM	Kick-off Meeting
L1	Level 1
LP	Local Processor
MWI	Microwave Imaging for Precipitation
MWS	Microwave Sounding
NetCDF	Network Common Data Form
NAVATT	NAVigation and ATTitude
NRB	Non-Conformance Review Board
NRT	Near Real Time
N/A	Not applicable
OS	Operating System
OSS	Open Source Software
PDGS	Payload Data Ground Segment
PFS	Product Format Specification
PGF	Product Generation Function
PGS	Product Generation Specification
PS	Processing Specification
QA	Quality Assurance
RCP	Requirement Check Point
REQ	REquirement
SAF	Satellite Application Facility
SCA	Scatterometer
SOW	Statement of Work
SW	SoftWare
TBC	To Be Confirmed
TBD	To Be Defined
TCE	Technical Computing Environment
TDS	Test Data Set
TN	Technical Note
TRB	Test Review Board
TRR	Test Readiness Review
VCD	Verification Control Document
VII	Visible-Infrared Imaging
WBS	Work Breakdown Structure
WP	Work Package
XPR	Exprivia S.p.A.

2.4. Open points

None.

3. Overview

This **MWS L1b LP** is in charge of generating MWS L1b products, as defined in [MWS-L1B-PFS], starting from the MWS L0 products, by using the algorithms specified in [MWS-L1B-PGS]. In addition, it generates the auxiliary Context Data files defined in [MWS-L1B-ADS].

The **MWS L1b LP** SW contains just one main processing chain: the **MWS L1b** processor. This processor is an independent executable item executed via command line or integrated in a processing framework based on job order interface.

4. Interfaces Design

A view of all the logical interfaces involving the MWS L1b LP processor is presented in Figure 4-1. In this figure and further in this document, the interfaces are referenced using a unique ID defined with the following nomenclature:

IF_<source>_<target>_<interface>

Where:

- <source> is the entity that generates the data item.
- <target> is the entity that receives the data item.
- <interface> is the exchanged interface.

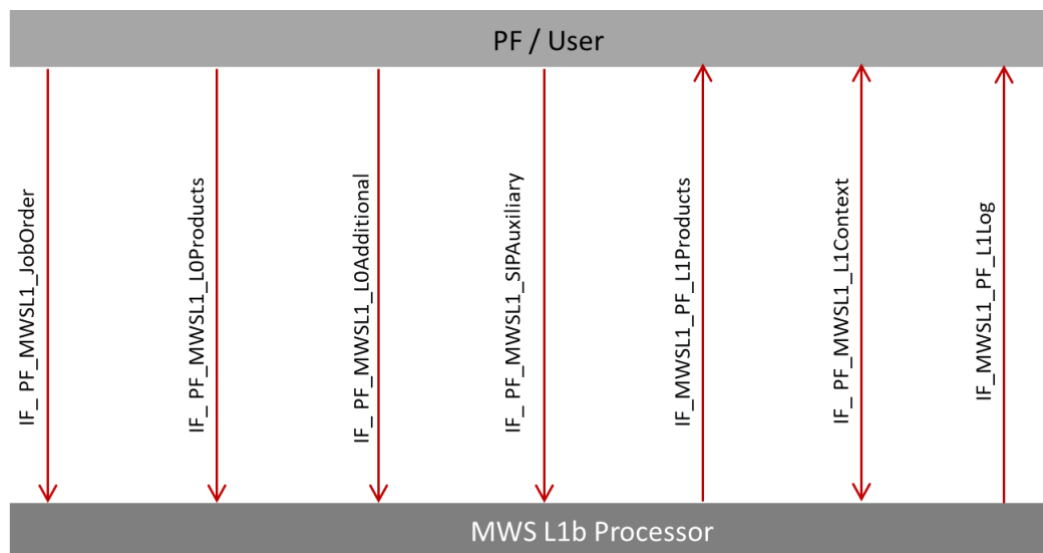


Figure 4-1. MWS L1b LP interface diagram.

Table 4-1 below provides a list of all the logical interfaces involving the MWS L1b LP processor.

Table 4-1. MWS L1b LP Logical Interfaces.

Source	Destination	Logical Interface	Description
PF/User	MWS Processor	IF_PF_MWSL1_JobOrder	It contains settings controlling processing options or algorithm performance, including (but not limited to): • Configuration settings • Input / Output / Intermediate file list and location • Specific processor configuration file • Dynamic Processing parameters.
PF/User	MWS Processor	IF_PF_MWSL1_L0Products	It contains the L0 products used by the MWS L1b processor as main inputs.
PF/User	MWS Processor	IF_PF_MWSL1_L0Additional	It contains the additional L0 products, used by the MWS L1b processor as an auxiliary file.
PF/User	MWS Processor	IF_PF_MWSL1_SIPAuxiliary	It contains all the Auxiliary data (SIP format) used and/or generated by the MWS L1b processor.
MWS Processor	PF/User	IF_MWSL1_PF_L1Products	It contains the L1b products generated by the MWS L1b processor.
MWS Processor or PF/User	PF/User or MWS Processor	IF_PF_MWSL1_L1Context	It contains all the MWS L1 Context Data used and/or generated by the MWS L1b processor.
MWS Processor	PF/User	IF_MWSL1_PF_L1Log	It contains the log messages and file generated by the MWS L1b processor for offline analysis.

5. Interfaces Description

5.1. IF_PF_MWSL1_JobOrder

5.1.1. Generic description

This interface includes the different file paths and other settings, that can be sent to the **MWS L1b Local Processor** either by the user or by the Processing Framework (PF).

Table 5-1 contains preliminary information about component exchange parameters.

Table 5-1. IF_PF_MWSL1_JobOrder component exchange parameters.

Component exchange parameter	Description
Source	PF/User
Target	MWS Processor
Initiator	PF/User
Type	Job Order
Protocol	Local file system
To be added if needed	–

This exchange is executed internally to the same environment.

5.1.2. Physical connection parameters

Data are exchanged via command line.

There is no protocol used to exchange data.

5.1.3. Exchanged Items

Table 5-2 contains preliminary information about component exchange parameters.

Table 5-2. IF_PF_MWSL1_JobOrder exchanged Items

IF code	Data Element Item	Description	Format
IF_PF_MWSL1_JOBORDER	JOBORDER	It contains the list of input and output data exchanged with the MWS L1b LP and controlling processing options.	XML [L1-AD Appendix D]

5.2. IF_PF_MWSL1_L0Products

5.2.1. Generic description

This interface includes the MWS L0 products, which are read by the **MWS L1b LP** processor and used as its main input.

Table 5-3 contains preliminary information about component exchange parameters.

Table 5-3. IF_PF_MWSL1_L0Products component exchange parameters.

Component exchange parameter	Description
Source	PF/User
Target	MWS Processor
Initiator	PF/User
Type	MWS L0 Products
Protocol	Local file system
To be added if needed	–

This exchange is executed internally to the same environment.

5.2.2. Physical connection parameters

Data are exchanged using a Local File System. All the data needed by the processor are referenced internally to Job Order. The Job Order will contain the absolute or relative path of the data to be processed.

There is no protocol used to exchange data.

5.2.3. Exchanged Items

The physical data items in Table 5-4 will be exchanged in this interface.

Table 5-4. IF_PF_MWSL1_L0Products exchanged Items

IF code	Data Element Item	Description	Format
IF_PF_MWSL1_MWS_0 0_SRC	MWS-00-SRC	It contains the MWS L0 products used by the MWS L1b processor as main inputs.	[L0-PFS]

5.3. IF_PF_MWSL1_L0Additional

5.3.1. Generic description

This interface includes the additional L0 products, which are used by the **MWS L1b LP** as auxiliary files.

Table 5-5 contains preliminary information about component exchange parameters.

Table 5-5. IF_PF_MWSL1_L0Additional component exchange parameters.

Component exchange parameter	Description
Source	PF/User
Target	MWS Processor
Initiator	PF/User
Type	MWS L0 Additional Product
Protocol	Local file system
To be added if needed	–

This exchange is executed internally to the same environment.

5.3.2. Physical connection parameters

Data are exchanged using a Local File System. All the data needed by the processor are referenced internally to Job Order. The Job Order will contain the absolute or relative path of the data to be processed.

There is no protocol used to exchange data.

5.3.3. Exchanged Items

The physical data items in Table 5-6 will be exchanged in this interface.

Table 5-6. IF_PF_MWSL1_L0Additional exchanged Items

IF code	Data Element Item	Description	Format
IF_PF_MWSL1_NAV_00_SRC	NAV-00-SRC	It contains SGA Navigation and Attitude information generated by the Satellite.	[L0-PFS]

5.4. IF_PF_MWSL1_SIPAuxiliary

5.4.1. Generic description

This interface includes all the Auxiliary Data files that are used as input by the **MWS L1b LP** processor.

The MWS Context Data files are not included in this interface as they are both input and output of the MWS L1b LP.

Table 5-7 contains preliminary information about component exchange parameters.

Table 5-7. IF_PF_MWSL1_SIPAuxiliary component exchange parameters.

Component exchange parameter	Description
Source	PF/User
Target	MWS Processor
Initiator	PF/User
Type	Auxiliary Data File
Protocol	Local file system
To be added if needed	–

This exchange is executed internally to the same environment.

5.4.2. Physical connection parameters

Data are exchanged using a Local File System. All the data needed by the processor are referenced internally to Job Order. The Job Order will contain the absolute or relative path of the data to be processed.

There is no protocol used to exchange data.

5.4.3. Exchanged Items

The physical data items in Table 5-8 will be exchanged in this interface.

Table 5-8. IF_PF_MWSL1_SIPAuxiliary exchanged Items

IF code	Data Element Item	Description	Format
IF_PF_MWSL1_MWS_1B_CCDB	MWS_1B_AUX_CDB	The MWS L1B Configuration and Calibration Parameters file contains all information necessary for the MWS geolocation and calibration.	NetCDF-4 [MWS-L1-ADS]
IF_PF_MWSL1_MWS_1B_CNF	MWS_1B_AUX_CNF	The MWS L1B LP Configuration Parameters file contains: The MWS L1b LP processors switches, which can be modified without the need of recompiling the s/w.	XML [MWS-L1-ADS] Customisation in Appendix C

Table 5-8. IF_PF_MWSL1_SIPAuxiliary exchanged Items

IF code	Data Element Item	Description	Format
		- The definition of the ISP structure of a MWS L0 product. - The definition of NetCDF variables of a MWS L1b product. - The definition of NetCDF variables of a MWS Context data file.	
IF_PF_MWSL1_MWS_LSM	MWS_1B_AUX_LSM_	The MWS Land-Sea Mask provides the information on whether the pixel is land, sea or coast.	NetCDF-4 [MWS-L1-ADS]
IF_PF_MWSL1_MWS_DEM	MWS_1B_AUX_DEM_	The MWS Digital Elevation Model provides information on the terrain elevation at pixel locations	NetCDF-4 [MWS-L1-ADS]
IF_PF_MWSL1_IBA	_____AUX_IBA_	The IERS bulletin A provides information on Earth's orientation in the IERS Reference System.	ASCII [GADS]
IF_PF_MWSL1_POFD	_____AUX_POFD	The predicted orbit file is a daily file covering day d to d+7; it contains orbit state vectors for a given Metop-SG satellite with an internal time step of 1 minute and in Earth-Fixed reference frame.	EO format [GADS]

5.5. IF_PF_MWSL1_L1Context

5.5.1. Generic description

This interface includes the MWS L1b Context Data, which are generated by the **MWS L1b LP** processor as secondary output, beside the MWS L1b products, and are also used as input.

Table 5-9 contains preliminary information about component exchange parameters.

Table 5-9. IF_PF_MWSL1_L1Context component exchange parameters.

Component exchange parameter	Description
Source	MWS Processor or PF/User
Target	PF/User or MWS Processor
Initiator	MWS Processor or PF/User
Type	MWS L1b Context Data
Protocol	Local file system
To be added if needed	–

This exchange is executed internally to the same environment.

5.5.2. Physical connection parameters

Data are exchanged using a Local File System.

There is no protocol used to exchange data.

5.5.3. Exchanged Items

The physical data items in Table **5-10** will be exchanged in this interface.

Table 5-10. IF_PF_MWSL1_L1Context exchanged Items

IF code	Data Element Item	Description	Format
IF_PF_MWSL1_MWS_1 B_COF	MWS_1B_AUX_C OF_	The MWS L1B Context Data is generated during the L1B processing of every MWS L0 data granule and serves as input to the processing of subsequent granule. It contains calibration coefficients and timestamp information.	NetCDF-4 [MWS-L1- ADS]

5.6. IF_MWSL1_PF_L1Products

5.6.1. Generic description

This interface includes the MWS L1b products, which are generated by the **MWS L1b LP** processor as its main output.

Table 5-11 contains preliminary information about component exchange parameters.

Table 5-11. IF_MWSL1_PF_L1Products component exchange parameters.

Component exchange parameter	Description
Source	MWS Processor
Target	PF/User
Initiator	MWS Processor
Type	MWS L1b Products
Protocol	Local file system
To be added if needed	–

This exchange is executed internally to the same environment.

5.6.2. Physical connection parameters

Data are exchanged using a Local File System.

There is no protocol used to exchange data.

5.6.3. Exchanged Items

The physical data items in Table 5-12 will be exchanged in this interface.

Table 5-12. IF_MWSL1_PF_L1Products exchanged Items

IF code	Data Element Item	Description	Format
IF_MWSL1_PF_MWS_1 B_RAD	MWS-1B-RAD	It contains the MWS L1b products generated by the MWS L1b processor as main outputs.	NetCDF-4 [MWS- L1B-PFS]

5.7. IF_MWSL1_PF_Log

5.7.1. Generic description

This interface includes the log messages and file that is generated by the **MWS L1b LP** processor, at each execution, for offline analysis. In addition, the log messages will be written into stdout and stderr.

The format and content of this file is described in [L1-AD].

Table 5-13 contains preliminary information about component exchange parameters.

Table 5-13. IF_MWSL1_PF_Log component exchange parameters.

Component exchange parameter	Description
Source	MWS Processor
Target	PF/User
Initiator	MWS Processor
Type	Log
Protocol	stdout / stderr / file system
To be added if needed	–

This exchange is executed internally to the same environment.

5.7.2. Physical connection parameters

Data are exchanged via command line and using a Local File System.

There is no protocol used to exchange data.

5.7.3. Exchanged Items

Table 5-14 contains preliminary information about component exchange parameters.

Table 5-14. IF_MWSL1_PF_Log exchanged Items

IF code	Data Element Item	Description	Format
IF_MWSL1_PF_LOG_FILE	LOGGING	Text file containing the processing log information. The list of error messages is specified in Appendix D.	ASCII strings [L1-AD Appendix E]
IF_MWSL1_PF_LOG_STDOUT	LOG_STDOUT	Log messages are written into stdout – the minimum log level written into stdout is configured in the Job Order. The list of error messages is specified in Appendix D.	ASCII strings [L1-AD Appendix E]

Table 5-14. IF_MWSL1_PF_Log exchanged Items

IF code	Data Element Item	Description	Format
IF_MWIL1_PF_LOG_STDERR	LOG_STDERR	Log messages are written into stderr – the minimum log level written into stderr is configured in the Job Order. The list of error messages is specified in Appendix D.	ASCII strings [L1-AD Appendix E]

6. LP Local Layout

The **MWS L1 LP** SW can be installed on a dedicated server or on existing servers at the station. It requires a single CPU core for its execution. The detailed instructions for the users of the software can be found in [MWS-SUM].

It can use dedicated data storage (on the server where it is deployed) or storage located elsewhere on the station network.

The installation package deployment tree is:

```
eps-sg-mws-l1-lp
├── bin
│   ├── mws_l1_lp.bin
│   ├── l1_lp_data_objects_test.bin
│   └── mws_l1_lp_algorithms_test.bin
├── lib
│   ├── libepssglpcommon.la
│   ├── libepssglpcommon.so
│   ├── libepssglpcommon.so.0
│   └── libepssglpcommon.so.x.y.z
```

Where *x.y.z* represents the 3 digits of the SW version number.

The deployment tree of one Acceptance Review test data set is provided here for sake of example. The file system paths to input/output data are provided to the **MWS L1 LP** processor through the Job Oder and are therefore configurable.

```
MWSL1LP-FUN-01
├── TDS-1
│   ├── input
│   │   ├── aux-data
│   │   ├── cof_l1
│   │   ├── mws_l0
│   │   └── navatt_l0
│   ├── jobborder
│   └── output
│       ├── cof_l1
│       └── mws_l1
```

Appendix A MWS L1b LP Job Order Customization

This appendix contains information about Job Order customized for **MWS L1b Local Processor**.

The standard XML Job Order, as defined in [L1-AD], defines all the parameters that the Processing Framework needs to pass to the **MWS L1b LP** SW processors. Table A-1 contains the customization.

Table A-1. MWS L1b LP Job Order Customization.

	Tag name	Value(s)	Description
	Processor_Name	MWS1LB	Label of the processor
=2	Version	The processor version as set into the task Table	The processor version
=2	Stdout_Log_Level	The possible log level values are: • DEBUG • INFO • WARNING • ERROR	Minimum log level that will appear through stdout
=2	Stderr_Log_Level	The possible log level values are: • DEBUG • INFO • WARNING • ERROR	Minimum log level that will appear through stderr
	Breakpoint_Enable	The possible values are: • false	This flag is enabled for troubleshooting orders. Always set to false for MWS.
	List_of_PGF_Procs: count	1	Number of task(s)
=3	Task_Name	EPSSG_MWS_L1B	Label of the task
=3	Task_Version	The task version as set into the task Table	Version of the task
=3	Breakpoint: count	[0]	
=4	List_of_Brk_Files: count	0	Number of breakpoint file types, none for MWS
=5	Brk_File [0]	No Breakpoint for MWS	
	List_of_Inputs: count	[3,9]	Number of input file types
	File_Type [3,9]	The possible values for MWS L1b processor input file types are: • MWS-00-SRC • NAV-00-SRC • MWS_1B_AUX_COF_ • MWS_1B_AUX_CCDB	Type of input file(s) used by the MWS L1b processor. The job order shall contain at least one file of File_Type MWS-00-SRC, one

Table A-1. MWS L1b LP Job Order Customization.

	Tag name	Value(s)	Description
		• MWS_1B_AUX_CNF_ • MWS_1B_AUX_LSM_ • MWS_1B_AUX_DEM_ • _____AUX_IBA_ • _____AUX_POFD	file of File_Type MWS_1B_AUX_CCDB and one file of File_Type MWS_1B_AUX_CNF_. More detailed information is available in Appendix B.
	File_Name_Type	Physical	The filenames for input files are the full name.
	List_of_Outputs: count	[2]	Number of output file(s)
	File_Type [2]	The possible values for MWS L1 LP output file types are: • MWS-1B-RAD • MWS_1B_AUX_COF_	Type of output file(s) used by the MWS L1b processor. For each file type, the job order contains 1 path.
	File_Name_Type	Stem	The filename for output files is the parent folder

Appendix B MWS L1b LP Task Table

This appendix contains information about Task Table customized for **MWS L1b Local Processor**.

The selection criteria and margins for the selection of input files of the **MWS L1b LP SW** are presented in Table B-1. This analysis is needed in order to configure the Task Table properly.

In Table B-1, the different columns are:

- **Functional Use:** the type of data the file provides.
- **Mandatory:** "Yes" if the processor will terminate with error if the file is not present and if this file is the only source of the corresponding functional use; "No" otherwise.
- **Input:** product ID of the input file.
- **Generation Frequency:** how often the file is generated.
- **Coverage:** the coverage of the file.
- **Selection Criteria:**
 - LatestValCover: This mode gets the latest file that covers entirely time interval specified in the Job Order plus the specified margins. The latest record is the one with the more recent Inventory Date.
 - ValIntersect: This mode gets all files that covers partly time interval specified in the Job Order plus the specified margins.
 - LatestValidity: This mode gets a product with the latest Validity Start Time.
- **Margin:** margin to be configured in the selection with respect to the start/stop times.

Assumptions and definitions:

- L0 do not overlap.
- TL0_start: start time of L0 Product.
- TL0_stop: stop time of L0 Product.

Table B-1. MWS L1b LP input data selection criteria.

Functional Use	Mandatory	Input	Generation Frequency	Coverage	Selection Criteria	Margin
L0 data	Yes	MWS-00-SRC	Every dump	TL0_start, TL0_stop	ValIntersect	T0=32s T1=32s
Context data	No	MWS_1B_AUX_COF_	Every dump	The most recent available	LatestValidity	No
INR	No	NAV-00-SRC	Every dump	TL0_start, TL0_stop	ValIntersect	T0=10s T1=10s
INR	No	_____AUX_POFD	Daily covering day d to d+7 (though the number of days covered is configurable)	TL0_start, TL0_stop	LatestValCover	T0=10s T1=10s
Time correlation	No	_____AUX_IBA_	One per week covering up to up to 365 days following the last day of data	TL0_start, TL0_stop	LatestValCover	No
CCDB	Yes	MWS_1B_AUX_CCDB	Infrequently	TL0_start, TL0_stop	LatestValCover	No
CNF	Yes	MWS_1B_AUX_CNF_	Infrequently	TL0_start, TL0_stop	LatestValCover	No
LSM	No	MWS_1B_AUX_LSM_	Infrequently (Validity Full Mission)	TL0_start, TL0_stop	LatestValCover	No
DEM	No	MWS_1B_AUX_DEM_	Infrequently (Validity Full Mission)	TL0_start, TL0_stop	LatestValCover	No

Table Table sample

```
<!-- edited with XML Spy v3.5 NT (http://www.xmlspy.com) by () -->
<PGF_Task_Table xmlns:a="http://www.acsys.it/schemas/IPF" xmlns:xsi="http://www.w3.org/2000/10/XMLSchema-instance"
xsi:schemaLocation="http://www.acsys.it/schemas/PGF_TaskTable.xsd">
  <Processor_Name>MWSL1LP</Processor_Name>
  <Version>1.0.0</Version>
  <Test>Yes</Test>
  <Min_Disk_Space units="MB">1024</Min_Disk_Space>
  <Max_Time units="sec">0<!--no time limit for execution-->
</Max_Time>
  <List_of_Cfg_Files count="0">
</List_of_Cfg_Files>
  <List_of_Dyn_ProcParams count="0">
</List_of_Dyn_ProcParams>
  <Sensing_Time_flag>True</Sensing_Time_flag>
  <List_of_Pools count="1">
    <Pool>
      <Detached>>false</Detached>
      <Killing_Signal>15</Killing_Signal>
      <List_of_Tasks count="1">
        <Task>
          <Name>EPSSG_LP_MWSL1</Name>
          <Version>01.00</Version>
          <Critical>true</Critical>
          <Criticality_Level>1</Criticality_Level>
          <File_Name>{ipflhome}/eps-sg-mws-l1-lp/bin/mws_l1_lp.bin</File_Name>
          <List_of_Inputs count="9">
            <Input>
              <Mode>ALWAYS</Mode>
              <Mandatory>Yes</Mandatory>
              <List_of_Alternatives count="1">
                <Alternative>
                  <Order>0</Order>
                  <Origin>DB</Origin>
                  <Retrieval_Mode>ValIntersect</Retrieval_Mode>
                  <T0 units="sec">32</T0>
                  <T1 units="sec">32</T1>
                  <File_Type>MWS-00-SRC</File_Type>
                  <File_Name_Type>Physical</File_Name_Type>
                </Alternative>
              </List_of_Alternatives>
            </Input>
          </List_of_Inputs>
        </Task>
      </List_of_Tasks>
    </Pool>
  </List_of_Pools>
</PGF_Task_Table>
```

```

<Input>
  <Mode>ALWAYS</Mode>
  <Mandatory>No</Mandatory>
  <List_of_Alternatives count="1">
    <Alternative>
      <Order>0</Order>
      <Origin>DB</Origin>
      <Retrieval_Mode>ValIntersect</Retrieval_Mode>
      <T0 units="sec">10</T0>
      <T1 units="sec">10</T1>
      <File_Type>NAV-00-SRC</File_Type>
      <File_Name_Type>Physical</File_Name_Type>
    </Alternative>
  </List_of_Alternatives>
</Input>
<Input>
  <Mode>ALWAYS</Mode>
  <Mandatory>No</Mandatory>
  <List_of_Alternatives count="1">
    <Alternative>
      <Order>0</Order>
      <Origin>DB</Origin>
      <Retrieval_Mode>LatestValCover</Retrieval_Mode>
      <T0 units="sec">10</T0>
      <T1 units="sec">10</T1>
      <File_Type>_____AUX_POFD</File_Type>
      <File_Name_Type>Physical</File_Name_Type>
    </Alternative>
  </List_of_Alternatives>
</Input>
<Input>
  <Mode>ALWAYS</Mode>
  <Mandatory>Yes</Mandatory>
  <List_of_Alternatives count="1">
    <Alternative>
      <Order>0</Order>
      <Origin>DB</Origin>
      <Retrieval_Mode>LatestValCover</Retrieval_Mode>
      <T0 units="sec">0</T0>
      <T1 units="sec">0</T1>
      <File_Type>MWS_1B_AUX_CCDB</File_Type>
      <File_Name_Type>Physical</File_Name_Type>
    </Alternative>
  </List_of_Alternatives>
</Input>

```

```

        </List_of_Alternatives>
    </Input>
    <Input>
        <Mode>ALWAYS</Mode>
        <Mandatory>Yes</Mandatory>
        <List_of_Alternatives count="1">
            <Alternative>
                <Order>0</Order>
                <Origin>DB</Origin>
                <Retrieval_Mode>LatestValCover</Retrieval_Mode>
                <T0 units="sec">0</T0>
                <T1 units="sec">0</T1>
                <File_Type>MWS_1B_AUX_CNF</File_Type>
                <File_Name_Type>Physical</File_Name_Type>
            </Alternative>
        </List_of_Alternatives>
    </Input>
    <Input>
        <Mode>ALWAYS</Mode>
        <Mandatory>Yes</Mandatory>
        <List_of_Alternatives count="1">
            <Alternative>
                <Order>0</Order>
                <Origin>DB</Origin>
                <Retrieval_Mode>LatestValidity</Retrieval_Mode>
                <T0 units="sec">0</T0>
                <T1 units="sec">0</T1>
                <File_Type>MWS_1B_AUX_COF</File_Type>
                <File_Name_Type>Physical</File_Name_Type>
            </Alternative>
        </List_of_Alternatives>
    </Input>
    <Input>
        <Mode>ALWAYS</Mode>
        <Mandatory>No</Mandatory>
        <List_of_Alternatives count="1">
            <Alternative>
                <Order>0</Order>
                <Origin>DB</Origin>
                <Retrieval_Mode>LatestValCover</Retrieval_Mode>
                <T0 units="sec">0</T0>
                <T1 units="sec">0</T1>
                <File_Type>MWS_1B_AUX_LSM</File_Type>
            </Alternative>
        </List_of_Alternatives>
    </Input>

```

```

        <File_Name_Type>Physical</File_Name_Type>
    </Alternative>
</List_of_Alternatives>
</Input>
<Input>
    <Mode>ALWAYS</Mode>
    <Mandatory>No</Mandatory>
    <List_of_Alternatives count="1">
        <Alternative>
            <Order>0</Order>
            <Origin>DB</Origin>
            <Retrieval_Mode>LatestValCover</Retrieval_Mode>
            <T0 units="sec">0</T0>
            <T1 units="sec">0</T1>
            <File_Type>MWS_1B_AUX_DEM</File_Type>
            <File_Name_Type>Physical</File_Name_Type>
        </Alternative>
    </List_of_Alternatives>
</Input>
<Input>
    <Mode>ALWAYS</Mode>
    <Mandatory>No</Mandatory>
    <List_of_Alternatives count="1">
        <Alternative>
            <Order>0</Order>
            <Origin>DB</Origin>
            <Retrieval_Mode>LatestValCover</Retrieval_Mode>
            <T0 units="sec">0</T0>
            <T1 units="sec">0</T1>
            <File_Type>_____AUX_IBA</File_Type>
            <File_Name_Type>Physical</File_Name_Type>
        </Alternative>
    </List_of_Alternatives>
</Input>
</List_of_Inputs>
<List_of_Outputs count="2">
    <Output>
        <Destination>DB</Destination>
        <Mandatory>Yes</Mandatory>
        <File_Type>MWS_1B_RAD</File_Type>
        <File_Name_Type>Stem</File_Name_Type>
    </Output>
    <Output>

```

```

                                <Destination>DB</Destination>
                                <Mandatory>No</Mandatory>
                                <File_Type>MWS_1B_AUX_COF</File_Type>
                                <File_Name_Type>Stem</File_Name_Type>
                            </Output>
                        </List_of_Outputs>
                        <List_of_Breakpoints count="0">
                        </List_of_Breakpoints>
                        <Number_of_CPUs>1</Number_of_CPUs>
                    </Task>
                </List_of_Tasks>
            </Pool>
        </List_of_Pools>
    </PGF_Task_Table>

```

Appendix C MWS L1b Processor Configuration File

The updated MWS L1B Processor Configuration files package, MWS_1B_AUX_CNF_ in [MWS-L1B-ADS], is composed of 5 files:

- Manifest.xml: The manifest describing the package content.
- MWS_L1B_AUX_CNFP_vvxyy.xml: The MWS L1b LP configuration parameters file.
- MWS_L1B_AUX_CNFO_vvxyy.xml: The MWS L0 Product configuration file.
- MWS_L1B_AUX_CNF1_vvxyy.xml: The MWS L1b Product configuration file.
- MWS_L1B_AUX_CNFC_vvxyy.xml: The MWS Context Data configuration file.

MWS L1b configuration parameters file

The MWS L1b LP configuration parameters file contains the additional parameters and switches used by the **MWS L1b LP** SW which are not already contained in MWS_1B_AUX_CCDB as defined in [MWS-L1B-ADS].

The MWS L1b LP configuration parameters file is a static XML file. Its content is defined in Table C-1.

Table C-1. MWS L1b LP configuration parameters XML file.

Field name	Description	Units
nbscan_memory_max	Maximum number of scans stored in memory, set-up to limit the memory consumption. If not set, all the scans can be stored in memory.	
l1b_nc_compression_level	Compression level of the output MWS L1b netCDF files, from 0 (no compression) to 9 (maximum compression level, also the slowest)	
cof_nc_compression_level	Compression level of the output COF netCDF file, from 0 (no compression) to 9 (maximum compression level, also the slowest)	
n_threads	Number of threads used for inner parallelisation	
validate_inputs_flag	Flag that activates the validation of input files. (1 = activated, 0 = deactivated)	
l1b_free_text	Free text of a length of 3 characters length, for L1b product filename. For arbitrary use, e.g. to discriminate product names that would otherwise be identical.	

MWS L0 Product configuration file

The MWS L0 product configuration file contains the definition of ISP structure of the MWS L0 products on input of the **MWS L1b LP** SW, in terms of variable disposition and size; the dispositions and sizes can be modified without the need of re-compiling the s/w.

The MWS L0 product configuration file is a static XML file, following this schema:

- ISP – root node
 - ISPHeader
 - ISPVariable – one for each variable of interest (specified by a variable name)
 - ISPVariableStartIndex
 - ISPVariableSize – optional
 - ISPVariableBitMask – optional
 - ISPDataBlock – one for each ISP type (specified by an internal field "TM_ID")
 - ApidList – list of APIDs covered by this TM_ID
 - Apid – one for each APID covered by this TM_ID
 - ISPVariable – one for each variable of interest (specified by a variable name)
 - ISPVariableStartIndex
 - ISPVariableSize – optional
 - ISPVariableBitMask – optional

Its content is described in Table C-2.

Table C-2. MWS L0 product configuration XML file.

Field name	Description	Units
ISPHeader	Node containing the specific binary schema the ISP header, common to all ISP types.	
ISPDataBlock	Node containing the specific data block binary mapping of an ISP, defined by the APID as an attribute.	
ISPVariable	Node containing the specific ISP variable details; variable name is defined as an attribute.	

Table C-2. MWS L0 product configuration XML file.

Field name	Description	Units
ISPVariableStartIndex	Start index of the variable in the TM packet (starting from 0)	
ISPVariableSize	Size of the field, in bytes. If not present, it is by default 1 byte.	
ISPVariableBitMask	Bitfield mask for variable decoding; if used, bit mask is applied and resulting value is shifted to LSB	
ApidList	Node containing a list of Apid elements.	
Apid	APID number.	

MWS L1b Product configuration file

The MWS L1b product configuration file contains the definition of NetCDF variables of the MWS L1b products on output of the **MWS L1b LP SW**, in terms of variable name and attributes; they can be modified without the need of re-compiling the s/w.

It is a copy of the XML representation of the NetCDF-4 EPS-SG MWS L1B product provided in [MWS-L1B-PFS] Appendix C with minor refinements to fit the needs of the **MWS L1b LP SW**, such as filling the values for fixed global attributes (e.g. summary, doi, keywords).

The following parameters shall be adjusted to each installation context:

- disposition_mode (Test, Commissioning, Operational or Validation).
- environment (Operational, Validation, Development, Integration and Verification, Engineering)
- processing_mode (NRT or Reprocessing)
- format_version (Refer Table 29 of MWS PFS)
- pgs_reference_and_version (EUM/LEO-EPSSG/SPE/14/777476 v[As per PGS version])
- pfs_reference_and_version (EUM/LEO-EPSSG/SPE/14/777550 v[As per PFS version])
- atbd_reference_and_version (EUM/LEO-EPSSG/SPE/14/737100 v[As per ATBD version])
- baseline

MWS Context Data configuration file

The Context Data configuration file contains the definition of NetCDF variables of the MWS Context Data on output of the **MWS L1b LP** SW, in terms of variable name and attributes; they can be modified without the need of re-compiling the s/w.

It is a copy of the XML representation of the NetCDF-4 auxiliary data file MWI_1B_COF provided in [MWS-L1B-ADS] Appendix A (one XML representation for each grid map resolution), with minor refinements such as filling the values for fixed global attributes (e.g. the documentReference version).

The following parameters shall be adjusted to each installation context:

- GR (set to "_" for the Local Processor).
- source.
- environment (OPE, VAL, IVV, DEV, ENG, ____)
- class (OPER, TEST, TD[00-99], SVT[0-9])
- documentReference (EUM/LEO-EPSSG/SPE/14/777588 v[latest MWS L1B ADS])

Appendix D MWS L1b LP Error Codes and Messages

The list of return codes and the list of warning and error codes used in the **MWS L1b LP** can be found in [MWS-SUM].

End of Document