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Aeolus Level 2b Processor Users Guide

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Aeolus Level 2B Processor Users Guide (NWP SAF style).

This documentation was developed within the context of the ESA ADM-Aeolus L2B project. It provides documentation in the style used by the EUMETSAT Satellite Application Facility on Numerical Weather Prediction (NWP SAF) to facilitate NWP user implementation.

The partners in the Aeolus L2B processor project are the ECMWF, KNMI, and Météo-France.

Change Record				
Issue.	Date	Modified pages/sections	Observations	Name
0.1	05-Dec-2007	--	First draft	J. de Kloe
0.2	20-May-2008	all	renamed from Users Manual to Users Guide to prevent confusion with the other ECSS style Users manual that we have. Updated to software version 1.33 adapted to ESA comments dd. 21-Apr-2008 Added pointers to chapters in referenced documents to make it easier for the user to find his way around.	J. de Kloe





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1. Introduction and scope

This document defines the Users Guide (UG), similar to what usually is called a User Manual in NWP SAF documentation, of the Aeolus Level 2B Processor (L2BP) software package, in accordance with the requirements of the NWP SAF.

Note that this ESA project has been documented according to the ECSS guidelines, and to minimise the amount of double documentation, the NWP SAF documents will refer to these ECSS documentation produced for ESA as much as possible.

Note also that this document has a large overlap with the ECSS style Software User Manual [RD-8].

The name Users Guide was chosen deliberately to prevent confusion with this ECSS style Software Users Manual (as agreed on L2B PM11, 5-feb-2008).

According to the NWP SAF document standards the UG should:

- enable the user to understand scientific principles and software implementation of the deliverable.
- incorporate PS, TLD, MD, SC, SP and selected items from TF.
- include instructions on how to install, configure, test and run the deliverable and how to report problems

1.1 Reference documents

[RD-1] ECSS-E-40B Space System Software Engineering, draft version, 28-June-2000

[RD-2] AE-DD-ECMWF-L2BP-001_20070223_DD_Iss1.0.pdf

[RD-3] MFG_L2BP_fortran_structures_20080509.doc

[RD-4] AE-SAFPS-KNMI-L2BP_20080520_v0.4.pdf

[RD-5] AE-IF-ECMWF-L2BP-002_20080116_ExtICD_Iss1.32.pdf

[RD-6] AE_TN_ECMWF_L2BP_0023_20070223_ATBD_V2.1.pdf

[RD-7] AE-TN-ECMWF-L2BP-0072_20070223_EE2BUFRGuide_Iss1.1.pdf

[RD-8] AE-MA-ECMWF-L2BP-001_20080229_SUM_Iss1.33.pdf

[RD-9] AE-SAF-KNMI_L2BP-003_Setup_Guide.v1.1.20080520.pdf

[RD-10] AE-RN-ECMWF-L2BP-001_20080229_SRN_Iss1.33.pdf

[RD-11] ADM-IC-52-1666_L1bP-IODD_Iss_3.5.pdf, 18-Feb-2008

[RD-12] AE-IF-ECMWF-L2BP-001_20080116_IODD_Iss1.32.pdf



[RD-13] AE-TN-MFG-GS-0003_20070615_RBCIODD_Iss1.2.pdf

[RD-14] AE-IF-DLR-L2A-004_IODD_Iss_1.4_070312.pdf



1.2 Acronyms

ECSS European Cooperation for Space Standardization

EE Earth Explorer (file format)

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HLOS	Horizontal projection of Line-Of-Sight (wind)
IFS	Integrated Forecasting System
L2BP	ADM-Aeolus Level 2B Processor
LUT	Look-Up-Table
MD	Module Design
PS	Product Specification
RBC	Rayleigh-Brillouin-Correction
SC	Source Code
SP	Science Plan
TF	Test Folder
TLD	Top Level Design
UM	Users Manual
UG	Users Guide

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2. Overview of the L2BP software and limitations

This section gives a brief overview of the L2BP software and its limitations. The L2BP software is intended to process the Level 1B product files provided by ESA in BUFR or Earth Explorer (EE) format and write its results to a Level 2B product file. Alternatively the subroutines from the processor may be incorporated in a larger system (like an Integrated Forecasting System).

More details on the design and capabilities of the software can be found in the Design Document (DD) [RD-2], and the Algorithm Theoretical Baseline Document (ATBD) [RD-6].

2.1 L2BP capabilities



The L2BP software is capable of:

- reading L1B product files in EE (BUFR to be added later), as produced by the L1B processor, versions 1.04 up to 1.10
- classifying the high resolution measurements, to discriminate between cases with and without clouds
- grouping the high resolution measurements of each class into a lower resolution observation
- retrieving HLOS wind profiles on observation scale for the Rayleigh channel, corrected for temperature, pressure and cross-talk effects, by using advance knowledge of temperature and pressure from an NWP model
- retrieving HLOS wind profiles on observation scale for the Mie channel
- assigning proper heights to the retrieved HLOS winds
- writing the results to an EE output file
- the L2BP has been organised in a few high level subroutines that should be easy to use within an integrated forecasting system
- the L2BP should readily compile and run on most recent Linux systems, and on IBM Unix (AIX), provided a proper Fortran90 compliant compiler is installed

2.2 L2BP limitations



The current L2BP software has the following limitations:

- reading of BUFR formatted L1B product files is not yet implemented
- writing of BUFR formatted L2B product files is not yet implemented
- the optical properties calculations, needed to process the Rayleigh channel in case the range bin definition does not match one-to-one with the Mie channel (and for which case some Rayleigh range bins have no corresponding Mie measurement information), is not yet fully tested, not yet operational, and cannot be used by external users.
- the schema directory is only partially defined. Not all xml files can yet be verified with the provided schemas.
- use of the auxiliary climatology and calibration files has not yet been implemented
- the L2BP is not yet portable to the SUN and NEC Unix platforms

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3. Changes between L2BP software versions 1.32 and 1.33

a list of changes is given in the Software Release Note (SRN) [RD-10], and will not be repeated here.

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4. Fortran90 UNIX/Linux installation instructions

Instructions on how to install the software are available in the Software Release Note [RD-10], chapter 3, and will not be repeated here.

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5. Running the L2BP as a standalone program

Most information needed to run the L2BP software is given in the ECSS style Software User Manual [RD-8], especially in section 8.5 and in part 2 of this document, titled “Operations Guide”.

For convenience, a short description will be inserted here as well.

The L2BP is a command line tool. It should be called with a single command line argument, called the JobOrder file, like this:

```
./L2B_processor Joborder.mylabel.xml
```

The JobOrder file is an xml file containing detailed instructions about the input files to be used by the processor, and the directories to be used for input and output.

The input files needed by the L2BP are:



- a Level 1B product file (see [RD-11], chapter 6, for a description of its format)
- an auxiliary L2B parameter settings file (see [RD-12], section 5.4 for a description of its format)
- one or more auxiliary meteo data files (may be replaced by a direct retrieval of meteo data from memory when the L2BP is used as a set of subroutines) (see [RD-12], section 5.1 for a description of its format)
- an auxiliary Rayleigh-Brillouin-Correction (RBC) Look-Up-Table (LUT) (see [RD-13] for a description of its format)
- an auxiliary climatology file (see [RD-12], section 5.3 for a description of its format)
- an auxiliary calibration file (see [RD-14], section 4.3 for a description of its format)

The L2BP software creates the following output files:

- one or more L2B product files (see [RD-12], section 4 for a description of its format)
- a product list file (a simple ASCII file summarising the file names of the L2B product files that have been generated).
- optionally a textual log file can be created, which will contain all formal logging information (currently also available in the stdout), but without all the (temporary) debugging and testing information currently issued on stdout.

All detailed settings for the scientific algorithms of the L2BP software are stored in the auxiliary L2B parameter settings file. This also is an xml file, which may be edited by a text editor to change the actions taken by the L2BP software.



Note that most of these files (except for the auxiliary L2B parameter settings file) are split in 2 parts. An xml header part with extension .HDR, and a binary part with extension .DBL. For convenience we consider these pairs as being one file when describing them.

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6. Known bugs in the L2BP software



The following bugs are currently known:

- this software is not portable to NEC and SUN Unix systems
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7. Reporting bugs in the L2BP software

Bug reports, queries and feedback may be send to the ESA Aeolus Project Team or the ECMWF (European Centre for Medium-Range Weather Forecasts.)

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8. Frequently Asked Questions

No questions from external users have reached us yet, so this section will be filled later when applicable.