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<u>Doc.-Title:</u>	<b>Aeolus Level 2a Processor Input/Output Data Definition</b>
<u>Number of pages:</u>	<b>40</b> pages
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## 0.1 Document Change Log

Issue.	Date	Modified pages (after insertion of new pages)	Observations	Name
V 0.1	01.09.06	--	Draft based on former AE.TN.DLR.IODD-L2A.200106; Major revision of ADS content based on AE-TN-MFG-L2A-0001 and decisions at L1b PM 7 see AE-MN-DLR-L1B-009	Huber
V 1.0	25.10.06	All pages reformatted	First version; comments on draft by A.-G. Straume (03.10.06) and O. LeRille (03.10.06) implemented	Huber
V 1.1	03.11.06	2, 12, 13, 14, 15, 16, 22	Errors fixed found by M.-L. Denneulin and D. Huber while coding L2A output	Huber
V 1.2	04.12.06	2, 6, 8, 9, 15, 22, 26, 27	Comments made by C. Caspar at GSDR implemented	Huber
V 1.3	17.01.07	25, 26, 29	Minor errors corrected	Huber
V 1.4	12.03.07	13, 20, 21, 22	SPR ADM-L2AP-0003	Huber
V 1.5	29.06.07	2, 8, 10, 11, 12, 13, 17, 18, 22, 24	SPR ADM-L2AP-0007 – SPR ADM-L2AP-0013	Huber
V 2.0	04.12.07	1 – 5, 7, 11, 12, 26 – 29, 32 - 38	Added description of AUX_PAR_2A file	Huber
V 2.1	31.01.08	2 – 5, 7, 9	FAT comments implemented	Huber
V 2.2	02.08	23, 24	Comments by CC on FAT update	Huber
V 2.3	04.08	8, 13	Internal	Huber
V 2.4	31.01.09	27, 31	CAL SPH, Total size, CAL DSDs	Huber
V 2.5	23.03.09		AR-IPF-1, AE-IPF-10, AE-IPF-13, AE-IPF-15, AE-IPF-17, AE-IPF-18, AE-IPF-21, AE-IPF-22	Huber
V 2.6	31.01.12		Delete section on AUX_CAL; correct size table 10 ;	Huber
V 3.0	15.02.13		Major revision of all sections for new CM product format of L2A prototype V3.2 Oct 2012	Huber
V 3.01	16.03.15	1, 2, 6, 7, 10, 11, 23, 25 -28, 31	AE-IPF-196 stop time of AUX_PAR_2A; AE-IPF-78 Baseline parameter added	Huber
V3.02 Draft 3	07.08.15		AE-IPF-216 AUX_PAR description to be updated; MPH and SPH description updated, and new section Quality_Flag in AUX_PAR	Huber

V3.02	31.08.15		MPH description updated; L2A product description new	Huber
V3.03			AE-IPF-160	Huber
V3.04	17.06.16	3 – 9, 13, 14, 31, 32, 36	AE-IPF-160 issues 105, 107, 108, 109, 110, 136, 137	Huber

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## 1 Introduction and Purpose of Document

This document defines the ADM-Aeolus L2A operational processor input and output data format. It is part of the deliverables of the contract studies

- “Aeolus Level 1B/2A Processor Refinement & Pre-Launch Validation” and one of the outputs of WP 2130,
- “Aeolus Level 1B/2A Processor Extended Pre-Launch Support” and one of the outputs of WP 2200, and
- “Aeolus Level 1B/2A Processor – Implementation of Continuous Mode Operations & Extended Pre-Launch Support” and one of the outputs of WP 2200. .
- “Aeolus Level 1B/2A Processor Enhancements and Launch Extension”, and one of the outputs of WP 1300.
- “Aeolus L1B/2A Processor – Further Enhancements and Launch Extension”, and one of the outputs of WP 1300.

Chapter 2 contains the list of applicable and referenced documents and a list of acronyms. Chapter 3 describes the format of the L2A output product and chapter 4 the format of the auxiliary data input files.

### 1.1 Format Definition Relation

The following table gives an overview over the format version of the different product types, where

- **File Type** denotes the specific sub-string of the product name that identifies the product.
- **Format Version** denotes the product format version that is also used to identify the proper xmlns version.
- **REF\_DOC** denotes the document reference and the version of the IODD that introduces that specific format version of a file. The value displayed in this column will be provided in the corresponding REF\_Doc fields of the binary .DBL files, the XML .HDR files, and the XML .EEF files.
- **Modified** is a field used to specify if a certain product has been modified with the current document version
- **Processor** denotes the software version at which the specific format version is introduced

**Table 1-1 Format Definition Table**

File Type	Format Version	REF_DOC	Modified	Processor
AUX_PAR_2A	03.03	AE-IF-DLR-L2A-004 3.03	N	03.03
ALD_U_N_2A	03.03	AE-IF-DLR-L2A-004 3.03	N	03.03

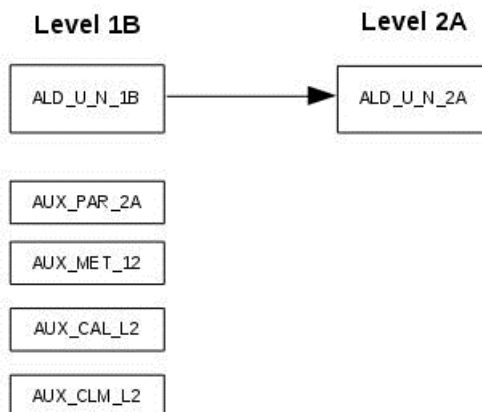
### 1.2 Relationship of Input/Output Data Definition Files

Table 1-2 summarises the Input/Output Data Definition Files used by the L2A processor.

**Table 1-2 List of Input/Output Data Definition Files**



File Type Identifier	File Type	Description	Created By	Used By
	<b>Level 1B Product File</b>			
ALD_U_N_1B	Level 1B Product File	[RD 4]	Level 1B Processor	Level 2A Processor PDS
	<b>Level 2A Product</b>			
ALD_U_N_2A	Level 2A Geophysical Parameters Product	Section 3	Level 2A Processor	PDS
	<b>Input Auxiliary Files</b>			
AUX_PAR_2A	Level 2A Processing Parameters	Section 4.3	L1bP HMI component or external tool	Level 2A Processor
AUX_MET_12	Auxiliary Meteorological Data	[RD 1]	External tool	Level 2A Processor
AUX_CAL_L2	Calibration Coefficients	[RD 10]	Calibration Software	Level 2A Processor
AUX_CLM_L2	Aerosol Extinction-To-Backscatter Ratio	[RD 1]	External tool	Level 2A Processor

The relationship and normal process flow between the various files passed to and from the Level 2a Processor software task is illustrated in Figure 1-1.



**Figure 1-1 Relationship of Input/Output Files**



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## 2 Documents & Acronyms

### 2.1 Applicable Documents

[AD 1] PDS-IPF ICD Generic Interface Guideline, **ESA-ID-ACS-GS-0001**

[AD 2] Earth Explorer Ground Segment File Format Standard, **PE-TN-ESA-GS-001**

[AD 3] ADM-AEOLUS ANNOTATED SOURCE PACKET FILES FORMAT DESCRIPTION  
TECHNICAL NOTE, **XADM-GSEG-EOPG-TN-04-0024**

### 2.2 Reference Documents

[RD 1] ADM-Aeolus Level-2B/2C Processor Input/Output Data Definitions Interface Control  
Document, **AE-IF-ECMWF-L2BP-001**

[RD 2] L2A IODD, **AE-IF-MFG-L2A-004**

[RD 3] Selection of L2B parameters, **AE-TN-MFG-L2P-0021**

[RD 4] Input/Output Data Definition Interface Control Document, **ADM-IC-52-1666**

[RD 5] Generation/Update of L2 Calibration Data at ACMF, **AE-TN-MFG-L2A-CAL-002**

[RD 6] L2A Algorithm Theoretical Basis Document, **AE-TN-IPSL-GS-001**

[RD 7] Aeolus Level 2a Processor Software User Manual, **AE-MA-DLR-L2A-002**

[RD 8] Aeolus Level 2a Processor External Interface Control Document, **AE-IF-DLR-L2A-001**

[RD 9] Generation and Update of AUX\_CSR, **AE-TN-MFG-L2P-CAL-003**

[RD 10] Generation of AUX\_CAL, Detailed Processing Model, Input/Output data definition, **AE-TN-MFG-L2P-CAL-004**

### 2.3 Acronyms

ADM-Aeolus	Atmospheric Dynamics Mission: Aeolus keeper of the winds	
ADS	Annotation Data Set	
AMD	Auxiliary Meteorological Data	
AUX	Auxiliary	
BRC	Basic Repeat Cycle	
CAL	Calibration	
COG	Centre of Gravity	
DBL	Data Block	
DEM	Digital Elevation Model	
DS	Data Set	
DSD	Data Set Descriptor	
DSR	Data Set Record	
FH	Fixed HeaderFSR	Free Spectral Range
GADS	Global Annotation Data Set	

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HDR	Header
ICD	Interface Control Document
IODD	Input/Output Data Definition
IPF	Instrument Processing Facility
KVT	Key Value Terminator
L1b	Level 1b
L2a	Level 2a
LOS	Line of sight
MDS	Measurement Data Set
MPH	Main Product Header
PCD	Product Confidence Data
PDS	Payload Data Segment
QC	Quality Control
SPH	Specific Product Header
USR	Useful Spectral Range
UTC	Universal Time Co-ordinates
XML	Extensible Mark up Language

### 3 L2A Geophysical Parameters Product

The L2A output products are profiles of aerosol optical depths, profiles of aerosol and molecular backscatter coefficients, profiles of extinction to backscatter ratios, profiles of scattering ratios, and elements of scene classification (water cloud, ice cloud, and aerosol cloud). Profiles of optical depths, aerosol, extinction-to-backscatter ratios and scattering ratios will be given at a horizontal resolution going from the measurement to the observation. The idea is to retrieve profiles with the finest possible resolution, but the averaging of several measurements may be necessary to reach a satisfactory signal quality.

The Aeolus Level 2A data products are generated using the Level 1B Wind Measurement product as input to the Level 2A processing step. Each Level 2A cloud and aerosol product can contain a variable amount of data. On average they contain data from one orbit, i.e. about 200 observations, but may contain up to 7 orbits of data (due to on-board storage of downlink data).

#### 3.1 Product Structure

The Level 2A product structure corresponds to the product structure described in [AD 2].

##### 3.1.1 File Name

The Level-2A Product file name has the format:

`AE_CCCC_ALD_U_X_2A_yyyymmddThhmmss_yyyymmddThhmmss_vvvv.EEE`

The extension `EEE` is `HDR` for the header and `DBL` for the data block. That is, the Level-2A product consists of two files:

- A header containing a Fixed Header, the MPH, and the SPH with DSDs. The header is in XML format and has extension `EEE='HDR'`.
- A data-block containing a copy of MPH and SPH in KVT format followed by the Data Sets in binary format. The data block has the file extension `EEE='DBL'`.

In the file name, `CCCC` can be either `TEST`, `OPER`, `RPRO`, or any other four letter string specified as order-type, see [RD 8] depending on whether the data were produced as part of an operational processing or for internal tests, `X` can be either `N`, `R`, or `T` for nominal or re processing, or tests, and `yyymmddThhmmss` and `vvvv` are validity starting and end dates and version number.

##### 3.1.2 File Structure

The Header File (extension `HDR`) contains a Fixed Header, a Main Product Header, and a Specific Product Header in XML format as described in [AD 2]. FH and MPH are common to all Aeolus products. Sizes in XML format are variable. Thus throughout this document, sizes of parameters and files in XML format (i.e. `HDR` and `EEF` files) are indicative only.

The data block file (extension `DBL`) recalls the MPH and the SPH in KVT format, followed by the binary data. Sizes in KVT format are fixed, but the tag names used throughout this document for the FH, MPH and SPH refer to XML format. For KVT format the same tag names written in upper case letters are used.

#### 3.2 Fixed Header

The structure of the Fixed Header is identical for all Earth-Explorer missions.

**Table 3-1 L2A Fixed Header Content Description**

Tag Name	Content Description	Unit	Type	Size (XML)		
Fixed_Header	Root Tag		Structure	29		
File_Name	Logical file name without the extension		String	11	62	13
File_Description	One line description of the file		String	18	32	20
Notes	Multi-lines free text		String	7	32	9
Mission	String representing the mission name ('Aeolus' for the ADM-Aeolus mission). Note that, in the File_Name, the Mission ID is a two character string ('AE' for the ADM-Aeolus mission)		String	9	6	11
File_Class	OPER or TEST (file type as indicated in the file name)		String	12	4	14
File_Type	The part of the file name that gives the file type. For L2A products, the only file type is ALD_U_N_2A.		String	11	10	13
Validity_Period	See Table 3-2 for structure description		Structure	18	112	19
File_Version	The vvvv part of the file name (see Section 3.1.1)		Integer	14	4	16
Source	See Table 3-3 for structure description		Structure	9	172	10
Total size for XML FH in bytes:				697		

**Table 3-2 L2A Fixed Header Validity\_Period Content Description**

Tag Name	Content Description	Unit	Type	Size (XML)		
Validity_Start	The validity of a file is managed by the PDGS environment itself, see [AD 3]. Omitting the micro seconds, Validity_Start time equals Sensing_Start of Table 3-4. To indicate the beginning of the mission, the special value: 'UTC=0000-00-00T00:00:00' can be used.	UTC	DateTime	16	23	18
Validity Stop	The validity of a file is managed by the PDGS environment itself, see [AD 3]. Omitting the micro seconds, Validity_Stop time equals Sensing_Stop of Table 3-4. To indicate the end of the mission, the special value: 'UTC=9999-12-31T23:59:59' can be used.	UTC	DateTime	15	23	17
Total size in bytes				112		

**Table 3-3 L2A Fixed Header Source content description**

Tag Name	Content Description	Unit	Type	Size (XML)		
System	Name of facility in charge of running the L2A processor.		String	8	19	10
Creator	L2A_ProcMain (official name of L2A processor).		String	9	12	11
Creator_Version	Version of L2AP used for the generation of the present product file.		String	17	12	19
Creation_Date	Date/time of creation.	UTC	DateTime	15	23	17
Total size in bytes:				172		

### 3.3 Main Product Header

The Main Product Header is identical to all Aeolus products.

**Table 3-4 L2A Main Product Header**

Tag Name	Content Description	Unit	Type	Size (KVT)			Size (XML)		
Main_Product_Header	Root tag for XML format only.		Structure	0	0	0	43		
Product	Logical file name, extension i.e., file name excluding the		String	9	62	2	9	62	11
Proc_Stage	Processing stage flag: 'N' for nominal processing (quasi-or close to real-time), 'T' for test product, 'R' for reprocessed.		Enum	11	1	1	12	1	14
Ref_Doc	Reference document describing the product		String	9	23	2	9	23	11
Spare_1			Spare	40	0	1	10	0	11
Acquisition_Station	Acquisition station ID		String	21	20	2	21	20	23
Proc_Center	Processing centre ID		String	13	6	2	13	6	15
Proc_Time	Time of processing	UTC	DateTime	11	27	2	11	23	13
Software_Ver	Software version number of processing software. Format: name of processor (up to 10 characters)/version number(4 characters)		String	14	14	2	14	14	16
Baseline	Baseline identifier (as provided by the Job Order File)		String	10	29	2	10	29	11
Sensing_Start	Start time of sensing	UTC	DateTime	15	27	2	15	23	17
Sensing_Stop	Stop time of sensing	UTC	DateTime	14	27	2	14	23	16
Spare_3			Spare	40	0	1	10	0	11
Phase	Phase number. If not used set to 'X', copied from L1B input product header.		Enum	6	1	1	7	1	9
Cycle	Cycle number, copied from L1B input product header.		IntAuc	6	4	1	7	4	9
Rel_Orbit	Start relative orbit number, copied from L1B input product header.		IntAs	10	6	1	11	6	13
Abs_Orbit	Start absolute orbit number, copied from L1B input product header.		IntAs	10	6	1	11	6	13
State_Vector_Time	Time of state vector, copied from L1B input product header.	UTC	DateTime	19	27	2	19	23	21
Delta_UT1	Delta_UT1 = UT1-UTC, copied from L1B input product header.	s	FAdo06	10	8	4	11	8	13
X_Position	X position in Earth-fixed reference, copied from L1B input product header.	m	FAdo73	11	12	4	12	12	14
Y_Position	Y position in Earth-fixed reference, copied from L1B input product header.	m	FAdo73	11	12	4	12	12	14
Z_Position	Z position in Earth-fixed reference, copied from L1B input product header.	m	FAdo73	11	12	4	12	12	14
X_Velocity	X velocity in Earth-fixed reference, copied from L1B input product header.	m/s	FAdo46	11	12	6	12	12	14
Y_Velocity	Y velocity in Earth-fixed reference, copied from L1B input product header.	m/s	FAdo46	11	12	6	12	12	14
Z_Velocity	Z velocity in Earth-fixed reference	m/s	FAdo46	11	12	6	12	12	14
Vector_Source	Not used by ADM, set to fixed string 'GP'.		String	15	2	2	15	2	17
Spare_4			Spare	40	0	1	10	0	11

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Utc_Sbt_Time	Time corresponding to SBT below (not used by ADM-Aeolus), copied from L1B input product header.	UTC	DateTime	14	27	2	14	23	16
Sat_Binary_Time	Satellite Binary Time (not used by ADM-Aeolus), copied from L1B input product header.		IntAul	16	11	1	17	11	19
Clock_Step	Clock step size (not used by ADM-Aeolus), copied from L1B input product header.	ps	IntAul	11	11	5	12	11	14
Spare_5			Spare	32	0	1	10	0	11
Leap_Utc	Time of occurrence of the next leap second	UTC	DateTime	10	27	2	10	23	12
Leap_Sign	Leap second sign (+001 if positive leap second, -001 if negative)		IntAc	10	4	1		11	
Leap_Err	Leap second error. '1' if leap second error occurs during processing segment, '0' otherwise		Boolean	9	1	1	10	1	12
Spare_6			Spare	40	0	1	10	0	11
Product_Err	'1' or '0'. If '1', errors have been reported in the product. User should then refer to the SPH or Quality ADS of the product for details of the error condition. '0' otherwise.		Boolean	12	1	1	13	1	15
Tot_Size	Total size of product (#bytes DSR+SPH+MPH)	bytes	IntAd	9	21	8	10	21	12
Sph_Size	Length of SPH (#bytes in SPH)	bytes	IntAl	9	11	8	10	11	12
Num_Dsd	Number of DSDs		IntAl	8	11	1	9	11	11
Dsd_Size	Length of each DSDs (#bytes for each DSD, all DSDs shall have the same length)	bytes	IntAl	9	11	8	10	11	12
Num_Data_Sets	Number of DSs attached (not all DSDs have a DS attached)		IntAl	14	11	1	15	11	17
Spare_7			Spare	40	0	1	10	0	11
<b>Total size in bytes</b>				<b>1247</b>			<b>1550</b>		

### 3.4 Specific Product Header

The specific product header has a structure specific to L2A products. It is detailed in table 5 below. The SPH ends with the list of Data Set Descriptors (DSDs).

**Table 3-5 L2A Specific Product Header**

Name	Description / Comment	Unit	Type	Size (KVT)			Size (XML)		
Specific_Product_Header	Root tag for XML format only. Set to AEOLUS_L2A_SPECIFIC_HEADER		Structure	0	0	0		51	
Sph_Descriptor	Specific Product Header descriptor: ASCII string describing the product		String	16	28	2	16	28	18
Spare_1			Spare	40	0	1	10	0	11
Intersect_Start_Lat	Latitude of the intersection of WGS84 DEM and the satellite line-of-sight for the first measurement (first measurement centroid time of the first BRC)	10-6degN	IntAl	20	11	11	21	9	23
Intersect_Start_Long	Longitude of the intersection of WGS84 DEM and the satellite line-of-sight for the first measurement (first measurement centroid time of the first BRC)	10-6degE	IntAl	21	11	11	22	10	24

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Intersect_Stop_Lat	Latitude of the intersection of WGS84 DEM and the satellite line-of-sight for the last measurement (last measurement centroid time of the last BRC)	10-6degN	IntAI	19	11	11	20	9	22
Intersect_Stop_Long	Longitude of the intersection of WGS84 DEM and the satellite line-of-sight for the last measurement (last measurement centroid time of the last BRC)	10-6degE	IntAI	20	11	11	21	10	23
Sat_Track	Sub-satellite track heading at the sensing start time in the MPH	deg	FAdo36	10	15	6	11	11	13
Spare_2			Spare	40	0	1	10	0	11
Num_Brc	Number of L1B input BRCs.		IntAI	8	11	1	10	11	11
Num_Meas_Max_Brc	Maximum number of measurements per BRC of the L1B input data.		IntAI	17	11	1	19	11	20
Num_Bins_Per_Meas	Number height bins without background bin.		IntAI	18	11	1	20	11	21
Num_Prof_Sca	Number of SCA BRC level profiles reported in this product.		IntAI	13	11	1	15	11	16
Num_Prof_Ica	Number of ICA BRC level profiles reported in this product.		IntAI	13	11	1	15	11	16
Num_Prof_Mca	Number of MCA BRC level profiles reported in this product.		IntAI	13	11	1	15	11	16
Num_Group_Tot	Number of group profiles reported in this product.		IntAI	14	11	1	16	11	17
Spare_3			Spare	40	0	1	10	0	11
List_of_Dsds	See 6 for a description.			5184			6426		
<b>Total size for KVT and XML in bytes</b>				<b>5732</b>			<b>7155</b>		

### 3.4.1 Data Set Descriptors

The Data Sets listed in table 6 appear in Aeolus Level 2A products, each described by a DSD in the SPH, see [RD 4] for format of DSD structure. The "Data Set Type" is "A" for Annotation Data Sets, "G" for Global Annotation Data Set, "M" for Measurement Data Sets and "R" for a Referenced Data Set, that is not attached to this product.

**Table 3-6 L2A Data Set Descriptors**

Num.	Data Set Descriptor Name	Content Description	Type	Update Frequency
1	Geolocation_ADS	DSD for Geolocation & AOCS data (attached). See Table 3.7 for a description.	A	1 DSR per BRC
2	Meas_PCD_ADS	DSD for L1B, CAL and CLM input screening quality control. See Table 3.10 for a description.	A	1 DSR per BRC
3	SCA_PCD_ADS	DSD for PCD of SCA products.	A	1 DSR per SCA profile
4	ICA_PCD_ADS	DSD for PCD of ICA products.	A	1 DSR per ICA profile
5	MCA_PCD_ADS	DSD for PCD of MCA products.	A	1 DSR per MCA profile
6	AMD_PCD_ADS	DSD for PCD of AMD input screening.	A	1 DSR per BRC.
7	Group_PCD_ADS	DSD for PCD of the processing of all algorithms.	A	1 DSR per group

8	SCA_Optical_Properties_MDS	DSD for SCA products.	M	1 DSR per SCA profile
9	ICA_Optical_Properties_MDS	DSD for ICA products.	M	1 DSR per ICA profile
10	MCA_Optical_Properties_MDS	DSD for MCA products.	M	1 DSR per MCA profile
11	AMD_ADS	DSD for Atmospheric, molecular data computed from MET files.	A	1 DSR per BRC
12	Group_Optical_Properties_MDS	DSD for group level products	M	1 DSR per group
13	Scene_Classification_ADS	DSD for Scene classification data	M	1 DSR per group
14	Level_2A_Proc_Params	DSD for L2A processing parameters (reference to auxiliary file)	R	No Ds
15	Aeolus_Level_1B_Product	DSD for the L1B input file (reference to)	R	No Ds
16	Aux_Met_Product	DSD for Meteorological Data (reference to auxiliary file).	R	No Ds
17	Cal_Product	DSD for calibration coefficients (reference to auxiliary file).	R	No Ds
18	Clim_Product	DSD for the aerosol backscatter to extinction ratio (reference to auxiliary file)	R	No Ds

## 3.5 Data Sets

### 3.5.1 Geolocation Annotation Data Set

The size of the Geolocation Annotation Data Set depends on the maximum number of measurements found in the L1B input BRCs. Sizes are calculated here for 30 measurements.

**Table 3-7 Geolocation\_ADS**

Name	Description / Comment	Unit	Type	Size (binary)
Start_of_Obs_Time	Start date and time of Observation (or BRC)	UTC	DateTime	12
Num_Meas_Eff	Effective number of measurement in the BRC.		IntAuc	1
List_of_Measurement_Geolocations	List of measurement geolocation structures. See Table 3-8 for Measurement_Geolocation structure description		List of Num_Meas_Max_Brc structures	24840
Geoid_Separation	Height of geoid above WGS84 ellipsoid. It is assumed this difference is valid for the whole observation.	m	FAdoxy	8
Total size in bytes				24861

**Table 3-8 List\_of\_Measurement\_Geolocation Content Description**

Name	Description / Comment	Unit	Type	Size (binary)
Centroid_Time	Measurement centroid time from L1B	UTC	DateTime	12
Mie_Geolocation	List of geolocation parameters of the 24 Mie height bins of the profile. See Table 3-9 for a description.		Structure	400
Rayleigh_Geolocation	List of geolocation parameters of the 24 Mie height bins of the profile. See Table 3-10 for a description.		Structure	400
Longitude_of_DEM_Intersection	Longitude of the intersection of the DEM and the line-of-sight	10-6degE	IntAI	4
Latitude_of_DEM_Intersection	Latitude of the intersection of the DEM and the line-of-sight	10-6degN	IntAI	4



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Altitude_of_DEM_Intersection	Altitude relative to the geoid of the intersection of the DEM and the line-of-sight	m	Fadoxy	8
Total size in bytes				828

**Table 3-9 Mie\_Geolocation Content Description**

Name	Description / Comment	Unit	Type	Size (binary)
List_of_Geolocation_of_Height_Bins	List of Geolocation Height Bin structures. This list contains 25 values. The first item contains the geolocation of the upper edge of the top-most bin (= defined as lower edge of bin 0). The remaining 24 items contain the geolocation of the lower edge of the each height bin. (bin 1~24). See Table 3-11 for structure description.		List of 25 Structures	400
Total size in bytes				400

**Table 3-10 Rayleigh\_Geolocation Content Description**

Name	Description / Comment	Unit	Type	Size (binary)
List_of_Geolocation_of_Height_Bins	List of Geolocation Height Bin structures. This list contains 25 values. The first item contains the geolocation of the upper edge of the top-most bin (= defined as lower edge of bin 0). The remaining 24 items contain the geolocation of the lower edge of the each height bin. (bin 1~24). See Table 3-11 for structure description.		List of 25 Structures	400
Total size in bytes				400

**Table 3-11 Geolocation\_of\_Height\_Bin Content Description**

Name	Description / Comment	Unit	Type	Size (binary)
Longitude_of_Height_Bin	Latitude of the start point of the profile height bin	10-6degN	IntAI	4
Latitude_of_Height_Bin	Longitude of the start point of the profile height bin.	10-6degE	IntAI	4
Altitude_of_Height_Bin	Bottom altitude of the height bin. The altitude is reference to a geoid.	m	Fadoxy	8
Total size in bytes				16

### 3.5.2 L1B Measurement Product Confidence Data

**Table 3-12 Meas\_PCD\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_of_Obs_Time	Start date and time of Observation (or BRC).	UTC	DateTime	12
L1B_Input_Screening	Structure describing any problems found during reading of the L1B datafile (see Table 3-13)		structure	247
L1B_CAL_Sceening	Structure describing any problem found during reading of the calibration datafile (see Table 3-16)		structure	6

L2A_Processing_QC	Structure describing QC parameters resulting from the processing algorithms (see Table 3-17)		structure	797
<b>Total size in bytes</b>				<b>1062</b>

**Table 3-13 L1B\_Input\_Screening Content Description**

Name	Description / Comment	Unit	Type	Binary
L1B_Obs_Screening	A code describing a problem which prevent using this whole BRC TBD		IntAuc	1
L1B_Obs_Screening_Flags1	5 bytes each holding up to 8 flags, so in total 40 flags to store individual problems detected in the L1B_Obs screening (exact definition to be defined later)  Bit 1 in byte 1 : TBD  Bit 2 in byte 1: TBD  ...  Bit 3 in byte 4 : TBD  ...  Bit 8 in byte 5 : TBD		5*IntAuc	5
L1B_Obs_Screening_Flags2				
L1B_Obs_Screening_Flags3				
L1B_Obs_Screening_Flags4				
L1B_Obs_Screening_Flags5				
List_of_L1B_Mie_Meas_Screening	List of N_Meas structures describing the problems found for each Mie measurement (see Table 3-14)		list of N_Meas structures	120
List_of_L1B_Rayleigh_Meas_Screening	List of N_Meas structures describing the problems found for each Rayleigh measurement (see Table 3-15)		list of N_Meas structures	120
Spare_1				1
<b>Total size in bytes</b>				<b>247</b>

**Table 3-14 L1B\_Mie\_Meas\_Screening Content Description**

Name	Description / Comment	Unit	Type	Binary
L1B_Mie_Meas_QC	A code describing a problem which prevent using this Mie measurement TBD		IntAus	2
L1B_Mie_Meas_QC_Flags	Flags describing problems which prevent using this Mie Measurement:  Bit 1 : TBD  Bit 2 : TBD  ...  Bit 8 : TBD		IntAuc	1
Spare_1				1
<b>Total size in bytes</b>				<b>4</b>

**Table 3-15 L1B\_Rayleigh\_Meas\_Screening Content Description**

Name	Description / Comment	Unit	Type	Binary
L1B_Rayleigh_Meas_QC	A code describing a problem which prevent using this Rayleigh measurement TBD		IntAus	2
L1B_Rayleigh_Meas_QC_Flags	Flags describing problems which prevent using this Rayleigh measurement:		IntAuc	1

	Bit 1 : TBD			
	Bit 2 : TBD			
	...			
	Bit 8 : TBD			
Spare_1				1
Total size in bytes				4

**Table 3-16 L1B\_CAL\_Screening Content Description**

Name	Description / Comment	Unit	Type	Binary
CAL_Valid	A flag indicating the calibration file was found correct.		IntAuc	1
Spare_1				5
Total size in bytes				6

**Table 3-17 L2A\_Processing\_QC Content Description**

Name	Description / Comment	Unit	Type	Binary
SCA_Applied	1 if the SCA is applied at BRC level; 0 else.		IntAuc	1
ICA_Applied	1 if the ICA is applied at BRC level; 0 else.		IntAuc	1
MCA_Applied	1 if the MCA is applied at BRC level; 0 else.		IntAuc	1
Spare_1				20
List_of_Feature_Finder_Indicators	List of Feature Finder algorithm module results. See Table 3-18 for structure description		Structure	774
Total size in bytes				797

**Table 3-18 Feature\_Finder\_Indicator Content Description**

Name	Description / Comment	Unit	Type	Binary
List_of_Layer_Information	Feature Finder output for 24 layers. See Table 3-19 for structure definition.		List of 24 structures	744
List_of_Lowest_Computable_Bins	See Table 3-21 for structure definition.		Structure	30
Total size in bytes				774

**Table 3-19 Layer\_Information Content Description**

Name	Description / Comment	Unit	Type	Binary
Bin_Loaded	Set to 1 if bin was loaded for group detection and groups have been discovered. Set 0 if bin was loaded for group detection, but no group detected. Set to -1 if bin was not loaded for group detection.		IntAuc	1
List_of_Seeds	Structure holding information on layer seeds (see Table 3-20).		Structure	30
Total size in bytes				31

**Table 3-20 Seed Content Description**

Name	Description / Comment	Unit	Type	Binary
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Seed	Set to 1 if the measurement was set as seed for the group detection, set to 0 if measurement was no seed.		IntAuc	1
<b>Total size in bytes</b>				<b>1</b>

**Table 3-21 Lowest\_Computable\_Bin Content Description**

Name	Description / Comment	Unit	Type	Binary
Lowest_Computable_Bin	Lowest (in atmosphere) bin that was used by the Feature Finder to detect groups for a maximum of 30 measurements.		IntAuc	1
<b>Total size in bytes</b>				<b>1</b>

### 3.5.3 SCA Product Confidence Annotation Data Set

This ADS is only written if the SCA was applied to the input L1B BRC level data. So the number of reported SCA PCD ADS is less or equal to the number of input L1B BRCs.

**Table 3-22 SCA\_PCD\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the SCA profile covered by the present DSR. This is the centroid time of the first measurement of the profile.	UTC	DateTime	12
First_Matching_Bin	Index of the first matching bin		IntAuc	1
QC_Flag	SCA QC flag about processed data: 1 if the first matching bin is clear; 0 else.		IntAuc	1
List_of_Profile_PCD_Bins	Structure containing variances of SCA BRC-level products bin per bin in Rayleigh scale. See Table 3-23 for structure definition.		List of 24 structures	600
List_of_Profile_PCD_Middle_Bins	Structure containing variances of SCA BRC-level products in bins made from 2 halves of adjacent original Rayleigh bins. See Table 3-24 for structure definition.		List of 23 structures	759
<b>Total size in bytes</b>				<b>1373</b>

**Table 3-23 Profile\_PCD\_Bin Content Description**

Name	Description / Comment	Unit	Type	Binary
Extinction_Variance	Variance of the extinction coefficient retrieved by the SCA in this bin.	m <sup>-2</sup>	FAdoxy	8
Backscatter_Variance	Variance of the backscatter coefficient retrieved by the SCA in this bin.	m <sup>-2</sup> * sr <sup>-2</sup>	FAdoxy	8
LOD_Variance	Variance of the LOD retrieved by the SCA in this bin.		FAdoxy	8
Processing_QC_Flag	QC information about processing		IntAuc	1
<b>Total size in bytes</b>				<b>25</b>

**Table 3-24 Profile\_PCD\_Middle\_Bin Content Description**

Name	Description / Comment	Unit	Type	Binary
Mid_Extinction_Variance	Variance of the extinction coefficient retrieved by the SCA in this bin.	m <sup>-2</sup>	FAdoxy	8
Mid_Backscatter_Variance	Variance of the backscatter coefficient retrieved by the SCA in this bin.	m <sup>-2</sup> * sr <sup>-2</sup>	FAdoxy	8

Mid_LOD_Variance	Variance of the LOD retrieved by the SCA in this bin.		FAdoxy	8
Mid_BER_Variance	Variance of the backscatter-to-extinction ratio.	sr <sup>-2</sup>	FAdoxy	8
Mid_Processing_QC_Flag	QC information about processing		IntAuc	1
Total size in bytes				33

### 3.5.4 ICA Product Confidence Annotation Data Set

This ADS is only written if the ICA was applied to the input L1B BRC level data. So the number of reported ICA PCD ADS is less or equal to the number of input L1B BRCs.

**Table 3-25 ICA\_PCD\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the ICA profile covered by the present DSR. This is the centroid time of the first measurement of the profile.	UTC	DateTime	12
First_Matching_Bin	Index of the first matching bin		IntAuc	1
QC_Flag	ICA QC flag about processed data: 1 if the first matching bin is clear; 0 else.		IntAuc	1
List_of_ICA_Processing_QC_Flag_Bins	Structure containing QC information about processing. See Table 3-26 for structure definition.		List of 24 structures	24
Total size in bytes				38

**Table 3-26 ICA\_Processing\_QC\_Flag\_Bin Content Description**

Name	Description / Comment	Unit	Type	Binary
ICA_Processing_QC_Flag_Bin	QC information about processing, currently set to 0.		IntAuc	1
Total size in bytes				1

### 3.5.5 MCA Product Confidence Annotation Data Set

This ADS is only written if the MCA was applied to the input L1B BRC level data. So the number of reported MCA PCD ADS is less or equal to the number of input L1B BRCs.

**Table 3-27 MCA\_PCD\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the MCA profile covered by the present DSR. This is the centroid time of the first measurement of the profile.	UTC	DateTime	12
List_of_MCA_Processing_QC_Flag_Bins	Structure containing QC information about processing. See Table 3.24 for structure definition.		List of 24 structures	24
Total size in bytes				36

**Table 3-28 MCA\_Processing\_QC\_Flag\_Bin Content Description**

Name	Description / Comment	Unit	Type	Binary
MCA_Processing_QC_Flag_Bin	QC information about processing, currently set to 0.		IntAuc	1

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<b>Total size in bytes</b>	<b>1</b>
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### 3.5.6 AMD Product Confidence Annotation Data Set

The Product Confidence Data Set for the synthetic signal calculated from the meteorological input data is reported for every L1B input BRC location.

**Table 3-29 AMD\_PCD\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the BRC covered by the present DSR.	UTC	DateTime	12
L2B_AMD_Screening_QC	A code describing a problem which prevent using this L2B AMD file, currently set to 0.		IntAuc	1
L2B_AMD_Screening_QC_Flags	Flags describing problems which prevent using this L2B AMD file, currently set to 0.		IntAuc	1
L2B_AMD_Collocations	List of Max_Num_Meas_Brc structures describing the problems found while collocating each measurement, see Table 3-30.		structure	90
<b>Total size in bytes</b>				<b>104</b>

**Table 3-30 L2B\_AMD\_Collocations Content Description**



Name	Description / Comment	Unit	Type	Binary
L2B_AMD_Collocation_QC	A code describing what problem occurred during the collocation of this measurement with the AUX NWP data, currently set to zero.		IntAuc	1
L2B_AMD_Collocation_QC_Flags	Flags describing what problems occurred during the collocation of this measurement with the AUX NWP data, currently set to 0.		IntAuc	1
Spare_1				1
<b>Total size in bytes</b>				<b>3</b>

### 3.5.7 Group Product Confidence Annotation Data Set

This Product Confidence Data Set shall be reported for all groups identified in all the input L1B BRCs. Thus the number of data sets reported exceeds the number of input L1B BRCs

**Table 3-31 Group\_PCD\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the group profile covered by the present DSR. This is the centroid time of the first measurement of the profile.	UTC	DateTime	12
Brc_Start	Brc of the first measurement of the group.		IntAuc	2
Measurement_Start	First measurement of the group.		IntAuc	1
Brc_End	Brc of the last measurement of the group.		IntAuc	2
Measurement_End	Last measurement of the group.		IntAuc	1
Height_Bin_Index	Index of the height level of the group in Rayleigh scale.		IntAuc	1
Upper_Problem_Flag	1: problem in the column above the group; 0 else. A problem may be slightly negative backscatter identified as a fluctuation around 0.		IntAuc	1

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Particle_Extinction_Variance	Variance of the particle extinction coefficient.	$\text{m}^{-2}$	Fadoxy	8
Particle_Backscatter_Variance	Variance of the particle backscatter coefficient.	$\text{m}^{-2} * \text{sr}$	Fadoxy	8
Particle_LOD_Variance	Variance of the particle local optical depth.		Fadoxy	8
QC_Flag	Currently set to 0.		IntAuc	1
Mid_Particle_Extinction_Variance_Top	Variance of the particle extinction coefficient in this height top middle bin.	$\text{m}^{-2}$	Fadoxy	8
Mid_Particle_Backscatter_Variance_Top	Variance of the particle backscatter coefficient in this height top middle bin.	$\text{m}^{-2} * \text{sr}$	Fadoxy	8
Mid_Particle_LOD_Variance_Top	Variance of the particle local optical depth in this height top middle bin.		Fadoxy	8
Mid_Particle_BER_Variance_Top	Variance of the BER in this height top middle bin.	$\text{sr}^{-2}$	Fadoxy	8
Mid_Particle_Extinction_Variance_Bot	Variance of the particle extinction coefficient in this height top middle bin.	$\text{m}^{-2}$	Fadoxy	8
Mid_Particle_Backscatter_Variance_Bot	Variance of the particle backscatter coefficient in this height top middle bin.	$\text{m}^{-2} * \text{sr}$	Fadoxy	8
Mid_Particle_LOD_Variance_Bot	Variance of the particle local optical depth in this height top middle bin.		Fadoxy	8
Mid_Particle_BER_Variance_Bot	Variance of the BER in this height top middle bin.	$\text{sr}^{-2}$	Fadoxy	8
<b>Total size in bytes</b>				<b>109</b>

### 3.5.8 SCA Optical Properties Measurement Data Set



This ADS is only written if the SCA was applied to the input L1B BRC level data. So the number of reported SCA PCD ADS is less or equal to the number of input L1B BRCs.

**Table 3-32 SCA\_Optical\_Properties\_MDS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the SCA profile covered by the present DSR. This is the centroid time of the first measurement of the profile.	UTC	DateTime	12
List_of_SCA_Optical_Properties	Structure containing SCA products for the BRC in the Rayleigh height levels, see Table 3-33 for structure description.		List of 24 structures	768
List_of_Geolocation_Middle_Bins	Horizontal averaged coordinates of the boundaries of the middle bins over the BRC. Middle bins are made of 2 halves of adjacent Rayleigh bins. See Table 3-34 for structure description.		List of 24 structures	384
List_of_SCA_Optical_Properties_Middle_Bins	Structure containing SCA BRC-level products in bins made from 2 halves of adjacent original Rayleigh bins, see Table 3-35 for structure description.		List of 23 structures	736
<b>Total size in bytes</b>				<b>1900</b>

**Table 3-33 SCA\_Optical\_Property Content Description**

Name	Description / Comment	Unit	Type	Binary
Extinction	Particle extinction of the height bin	$10^{-6} * \text{m}^{-1}$	Fadoxy	8

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Backscatter	Particle backscatter of the height bin	$10^{-6} * m^{-1} * sr^{-1}$	FAdoxy	8
LOD	Particle LOD of the height bin		FAdoxy	8
SR	Scattering ratio of the height bin.		FAdoxy	8
<b>Total size in bytes</b>				<b>32</b>

**Table 3-34 Geolocation\_Middle\_Bin Content Description**

Name	Description / Comment	Unit	Type	Size (binary)
Longitude_of_Middle_Bin	Latitude of the start point of the profile middle bin	10-6degN	IntAI	4
Latitude_of_Middle_Bin	Longitude of the start point of the profile middle bin.	10-6degE	IntAI	4
Altitude_of_Middle_Bin	Bottom altitude of the middle bin.	m	Fadoxy	8
<b>Total size in bytes</b>				<b>16</b>

**Table 3-35 Sca\_Optical\_Property\_Middle\_Bin Content Description**

Name	Description / Comment	Unit	Type	Binary
Mid_Extinction	Particle extinction of the middle bin	$10^{-6} * m^{-1}$	FAdoxy	8
Mid_Backscatter	Particle backscatter of the middle bin	$10^{-6} * m^{-1} * sr^{-1}$	FAdoxy	8
Mid_LOD	Particle LOD of the middle bin		FAdoxy	8
Mid_BER	Backscatter-to-extinction ratio of the middle bin.		FAdoxy	8
<b>Total size in bytes</b>				<b>32</b>

### 3.5.9 ICA Optical Properties Measurement Data Set

This ADS is only written if the ICA was applied to the input L1B BRC level data. So the number of reported ICA PCD ADS is less or equal to the number of input L1B BRCs.

**Table 3-36 ICA\_Optical\_Properties\_MDS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the ICA profile covered by the present DSR. This is the centroid time of the first measurement of the profile.	UTC	DateTime	12
List_of_ICA_Optical_Properties	Structure containing ICA products for the BRC in the Rayleigh height levels, see Table 3-37 for structure description.		List of 24 structures	600
<b>Total size in bytes</b>				<b>612</b>

**Table 3-37 ICA\_Optical\_Property Content Description**

Name	Description / Comment	Unit	Type	Binary
Case	Filling case estimated by the algorithm		IntAuc	1
Extinction	Particle extinction of the height bin	$10^{-6} * m^{-1}$	FAdoxy	8
Backscatter	Particle backscatter of the height bin	$10^{-6} * m^{-1} * sr^{-1}$	FAdoxy	8
LOD	Particle LOD of the height bin		FAdoxy	8



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<b>Total size in bytes</b>	<b>25</b>
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### 3.5.10 MCA Optical Properties Measurement Data Set

This ADS is only written if the MCA was applied to the input L1B BRC level data. So the number of reported MCA PCD ADS is less or equal to the number of input L1B BRCs.

**Table 3-38 MCA\_Optical\_Properties\_MDS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the MCA profile covered by the present DSR. This is the centroid time of the first measurement of the profile.	UTC	DateTime	12
List_of_MCA_Optical_Properties	Structure containing MCA products for the BRC in the Rayleigh height levels, see Table 3-39 for structure description.		List of 24 structures	576
<b>Total size in bytes</b>				<b>588</b>

**Table 3-39 MCA\_Optical\_Property Content Description**

Name	Description / Comment	Unit	Type	Binary
ClimBER	Particle backscatter-to-extinction ratio extracted from the climatology	sr <sup>-1</sup>	FAdoxy	8
Extinction	Particle extinction of the bin	10 <sup>-6</sup> * m <sup>-1</sup>	FAdoxy	8
LOD	Particle LOD of the bin		FAdoxy	8
<b>Total size in bytes</b>				<b>24</b>

### 3.5.11 Auxiliary Meteorological Data Measurement Data Set

The Measurement Data Set for the synthetic signal calculated from the meteorological input data is reported for every input L1B BRC location.

**Table 3-40 AMD\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the BRC covered by the present DSR.	UTC	DateTime	12
List_of_AMD_Properties	List of structure containing molecular atmospheric data, see Table 3-41 for structure definition.		List of 24 structures	1824
<b>Total size in bytes</b>				<b>1836</b>

**Table 3-41 AMD\_Property Content Description**

Name	Description / Comment	Unit	Type	Binary
Pressure_FP	NWP pressure in current Rayleigh bin.	Pa	IntAI	4
Temperature_FP	NWP temperature in current Rayleigh bin.	10 <sup>-2</sup> *K	IntAus	2
FrequencyShift_FP	Doppler frequency shift in current Rayleigh bin derived from NWP wind velocity estimation.	10 <sup>6</sup> *Hz	FAdoxy	8
RelativeHumidity_FP	NWP relative humidity in current Rayleigh bin.		FAdoxy	8
MolecularLOD_FP	NWP-derived molecular local optical depth in current Rayleigh bin.		FAdoxy	8

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MolecularBackscatter_FP	NWP-derived backscatter coefficient in current Rayleigh bin.	$10^{-6} \cdot \text{m}^{-1} \cdot \text{sr}^{-1}$	FAdoxy	8
Pressure_Fiz	NWP pressure in current Mie bin.	Pa	IntAl	4
Temperature_Fiz	NWP temperature in current Mie bin.	$10^{-2} \cdot \text{K}$	IntAus	2
FrequencyShift_Fiz	Doppler frequency shift in current Mie bin derived from NWP wind velocity estimation.	$10^6 \cdot \text{Hz}$	FAdoxy	8
RelativeHumidity_Fiz	NWP relative humidity in current Mie bin.		FAdoxy	8
MolecularLOD_Fiz	NWP-derived molecular local optical depth in current Mie bin.		FAdoxy	8
MolecularBackscatter_Fiz	NWP-derived backscatter coefficient in current Mie bin.	$10^{-6} \cdot \text{m}^{-1} \cdot \text{sr}^{-1}$	FAdoxy	8
<b>Total size in bytes</b>				<b>76</b>

### 3.5.12 Group Optical Properties Measurement Data Set

This Measurement Data Set shall be reported for all groups identified in all the input L1B BRCs. Thus the number of data sets reported exceeds the number of input L1B BRCs

**Table 3-42 Group\_Optical\_Properties\_MDS Content Description**



Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the group profile covered by the present DSR. This is the centroid time of the first measurement of the group.	UTC	DateTime	12
Height_Bin_Index	Index of the height level of the group in Rayleigh scale.		IntAuc	1
Group_Optical_Property	Structure containing particle products in the group's height level, see Table 3-43 for structure description.		Structure	32
Group_Geolocation_Middle_Bins	Horizontal averaged coordinates of the boundaries of the middle bins over the group. See Table 3-44 for structure description.		Structure	48
Group_Optical_Property_Middle_Bins	Structure containing the averages values for the group. See Table 3-45 for structure description.		Structure	64
<b>Total size in bytes</b>				<b>157</b>

**Table 3-43 Group\_Optical\_Property Content Description**

Name	Description / Comment	Unit	Type	Binary
Group_Extinction	Particle extinction of the height bin	$10^{-6} \cdot \text{m}^{-1}$	FAdoxy	8
Group_Backscatter	Particle backscatter of the height bin	$10^{-6} \cdot \text{m}^{-1} \cdot \text{sr}^{-1}$	FAdoxy	8
Group_LOD	Particle LOD of the height bin		FAdoxy	8
Group_SR	Scattering ratio of the height bin.		FAdoxy	8
<b>Total size in bytes</b>				<b>32</b>

**Table 3-44 Group\_Geolocation\_Middle\_Bins Content Description**

Name	Description / Comment	Unit	Type	Size (binary)
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Start_Longitude_of_Group	Latitude of the start point of the two group middle bins.	10-6degN	IntAI	4
Start_Latitude_of_Group	Longitude of the start point of the two group middle bins.	10-6degE	IntAI	4
Start_Altitude_of_Group	Altitude of the start point of the two middle bins.	m	Fadoxy	8
Mid_Longitude_of_Group	Latitude of the md point of the two group middle bins.	10-6degN	IntAI	4
Mid_Latitude_of_Group	Longitude of the mid point of the two group middle bins.	10-6degE	IntAI	4
Mid_Altitude_of_Group	Altitude of the mid point of the two middle bins.	m	Fadoxy	8
Stop_Longitude_of_Group	Latitude of the stop point of the two group middle bins.	10-6degN	IntAI	4
Stop_Latitude_of_Group	Longitude of the stop point of the two group middle bins.	10-6degE	IntAI	4
Stop_Altitude_of_Group	Altitude of the stop point of the two middle bins.	m	Fadoxy	8
<b>Total size in bytes</b>				<b>48</b>

**Table 3-45 Group\_Optical\_Property\_Middle\_Bins Content Description**

Name	Description / Comment	Unit	Type	Binary
Mid_Extinction_Top	Particle extinction of the top middle bin	$10^{-6} * m^{-1}$	FAdoxy	8
Mid_Backscatter_Top	Particle backscatter of the top middle bin	$10^{-6} * m^{-1} * sr^{-1}$	FAdoxy	8
Mid_LOD_Top	Particle LOD of the top middle bin		FAdoxy	8
Mid_BER_Top	Backscatter-to-extinction ratio of the top middle bin.		FAdoxy	8
Mid_Extinction_Bot	Particle extinction of the bottom middle bin	$10^{-6} * m^{-1}$	FAdoxy	8
Mid_Backscatter_Bot	Particle backscatter of the bottom middle bin	$10^{-6} * m^{-1} * sr^{-1}$	FAdoxy	8
Mid_LOD_Bot	Particle LOD of the bottom middle bin		FAdoxy	8
Mid_BER_Bot	Backscatter-to-extinction ratio of the bottom middle bin.		FAdoxy	8
<b>Total size in bytes</b>				<b>64</b>

### 3.5.13 Scene Classification Measurement Data Set

This Measurement Data Set shall be reported for all groups identified in all the input L1B BRCs. Thus the number of data sets reported exceeds the number of input L1B BRCs

**Table 3-46 Scene\_Classification\_ADS Content Description**

Name	Description / Comment	Unit	Type	Binary
Start_Time	Start date and time of the group profile covered by the present DSR. This is the centroid time of the first measurement of the group.	UTC	DateTime	12
Height_Bin_Index	Index of the height level of the group in Rayleigh scale.		IntAuc	1

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Aladin_Cloud_Flag	<p>Flag testifying for various pieces of information inferred from instrumental data and from NWP relative humidity. 4 flags are included in this one:</p> <p>TopCIBER: 1 if the BER of the upper middle bin is lesser than a given threshold under which a cloud is assumed. 0 else.</p> <p>DownCIBER: 1 if the BER of the lower middle bin is lesser than the threshold. 0 else.</p> <p>CISR: 1 if the scattering ratio in the bin is greater than a given threshold above which a cloud is assumed. 0 else.</p> <p>CIRH: 1 if the relative humidity is greater than a given threshold. 0 else.</p> <p>It is built as: <math>\text{TopCIBER} + 2 * \text{DownCIBER} + 4 * \text{CISR} + 8 * \text{CIRH}</math>.</p> <p>Interpretation of single bits:</p> <p>0: no cloud.</p> <p>1: the BER says there is a cloud in the upper middle bin, but not in the lower one. Nor the SR and the RH foresee a cloud.</p> <p>2: the BER says there is a cloud in the lower middle bin, but not in the upper one. Nor the SR and the RH foresee a cloud.</p> <p>3: the BER says there is a cloud in both middle bins. Nor the SR and the RH foresee a cloud.</p> <p>4: only the SR says there is a cloud.</p> <p>5: SR &amp; upper BER find a cloud.</p> <p>6: SR &amp; lower BER find a cloud.</p> <p>7: SR &amp; both BERs find a cloud.</p> <p>8: only the RH from NWP finds a cloud in at least a part of the bin..</p> <p>9: RH &amp; upper BER find a cloud.</p> <p>10: RH &amp; lower BER find a cloud.</p> <p>11: RH &amp; both BERs find a cloud.</p> <p>12: RH &amp; SR find a cloud.</p> <p>13 RH &amp; SR &amp; upper BER find a cloud.</p> <p>14: RH &amp; SR &amp; lower BER find a cloud.</p> <p>15: all flags say there is a cloud.</p>			
			IntAuc	1

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NWP_Cloud_Flag	<p>Flag testifying for various pieces of information about the cloud composition inferred from NWP data. CIContent is based on clwc &amp; ciwc analysis and CITp on the temperature analysis, in case the lidar detects a cloud unforeseen by the model.</p> <p>- CIContent: 0 if no cloud is forecasted; 1 if there is only a liquid phase; 2 if there is a mixed liquid+solid phase (i.e. clwc and ciwc are, each taken separately, &gt;0 in at least one region of the group); 3 if there is only a solid phase.</p> <p>- CITp: 1 if there is only a liquid phase (<math>T &gt; 273.15K</math>); 2 if there is a probability of a mixed liquid+solid phase (<math>233.15K &lt; T &lt; 273.15K</math>); 3 if there is only a solid phase (<math>T &lt; 273.15K</math>).</p> <p>It is built as: <math>CITp + 3 * CIContent</math>.</p> <p>1: no cloud forecasted but if one is detected, it will be in liquid phase.  2: no cloud forecasted but if one is detected, it may be in mixed phase.  3: no cloud forecasted but if one is detected, it will be in solid phase.  4: liquid cloud forecasted.  5: liquid cloud forecasted but if one is detected, it may be in mixed phase.  6: liquid cloud forecasted but if one is detected, it may be in solid phase (very unlikely).  7: mixed phase cloud forecasted but if one is detected, it will be in liquid phase (very unlikely).  8: mixed phase cloud forecasted.  9: mixed phase cloud forecasted but if one is detected, it will be in solid phase(very unlikely).  10: solid phase cloud forecasted but if one is detected, it will be in liquid phase (very unlikely).  11: solid phase cloud forecasted but if one is detected, it may be in mixed phase.  12: solid cloud forecasted.</p>				
L2A_Group_Class_Reliability	Coefficient characterising the reliability of the classification.			IntAuc	1
Spare_1				FAdoxy	8
					1
<b>Total size in bytes</b>					<b>24</b>

### 3.6 Size

Table 32 summarizes the typical product size for Aeolus Level 2A products. The size of the product will not necessarily be fixed, so the sizes given are only rough approximations. This assumes an orbit contains ~470 observations, N\_Max = 30 measurements, all BRCs are processed with the ICA, and 6 groups per BRC are found.

The upper bound of the number of L1B input BRCs is used to estimate the sizes for the SCA, ICA, and MCA profile data reported on L1B input BRC level.

**Table 3-47 L2A file size estimation**

	Section	Format	Size per orbit in bytes
Header File	FH	XML	~ 650
	MPH	XML	~ 1800
	SPH	XML	~ 4250
Total size in bytes for HDR file			~ 6700
Data Block	MPH	KVT	1247
	SPH	KVT	5732
	Geolocation_ADS	Binary	11684670
	Meas_PCD_ADS	Binary	499140
	SCA_PCD_ADS	Binary	645310
	ICA_PCD_ADS	Binary	17860
	MCA_PCD_ADS	Binary	16920
	AMD_PCD_ADS	Binary	48880
	Group_PCD_ADS	Binary	307380
	SCA_Optical_Properties_MDS	Binary	893000
	ICA_Optical_Properties_MDS	Binary	287640
	MCA_Optical_Properties_MDS	Binary	276360
	AMD_ADS	Binary	862920
	Group_OPT_MDS	Binary	442740
	SCL_ADS	Binary	67680
Total size in bytes for DBL file			16057479 ~ 16MB

## 4 Input Auxiliary Files

### 4.1 Auxiliary Meteorological Data

AUX\_MET\_12, see section 5.1 of [RD 1].

### 4.2 Calibration Coefficients

AUX\_CAL\_L2, see section 5.3 of reference [RD 10].

### 4.3 L2A Processing Parameters

The L2A Processing Parameters file is a file in XML format. All size values given in the following tables are estimated lower bound sizes.

#### 4.3.1 Product Structure

The Level 2A Processing Parameters product is contained in one product file containing Fixed Header and Main Product Header as defined in sections 3.2 and 3.3 respectively, as well as a Specific Product Header and a Data Set as described in following subsections. All headers and data sets are in XML format.

The Level 2A Processing Parameters auxiliary file name has the format defined in Section 3.1.1:

AE\_CCCC\_AUX\_PAR\_2A\_yyyymmddThhmmss\_99991231T235959\_vvvv.EEF

The date/times represent the start and stop of the validity period. This validity period will generally extend over a long period of time. The product file has an extension .EEF to designate a single file in XML format.

#### 4.3.2 FH

See also section 3.2.

**Table 4-1 Fixed Header of AUX\_PAR\_2A file**

Tag Name	Content Description	Unit	Type	
Fixed_Header	Root tag		String	29
File_Name	Logical file name without the extension		String	83
File_Description	One line description of the file		String	72
Notes	Multi-lines free text		String	50
Mission	String representing the mission name ('Aeolus' for the ADM-Aeolus mission). Note that, in the File_Name, the Mission ID is a two character string ('AE' for the ADM-Aeolus mission)		String	43
File_Class	This order type is a 4 character string. Currently the order types "TEST", "OPER", "RPRO" and "OFFL" are defined. The list of order types may be expanded or modified depending on operational needs.		String	49
File_Type	The part of the file name that gives the file class. Here, AUX_PAR_2A.		String	33
Validity_Period	See Table 4-2 for structure description		Structure	145
File_Version	The vvvv part of the file name (see §5.1). Set to 0001.		Integer	33
Source	See Table 4-3 for structure description		Structure	171

Total size for XML FH in bytes:

708

**Table 4-2 Validity\_Period Content Description**

Tag Name	Content Description	Unit	Type	
Validity_Start	The validity of a file is managed by the PDGS environment itself, see [AD 3]. Omitting the micro seconds, Validity_Start time equals Sensing_Start of Table 3 7.	UTC	DateTime	56
Validity_Stop	The validity of a file is managed by the PDGS environment itself, see [AD 3]. Omitting the micro seconds, Validity_Stop time equals Sensing_Stop of Table 3 7. To indicate the end of the mission, the special value: 'UTC=9999-12-31T23:59:59' can be used.	UTC	DateTime	54
Total size for XML FH in bytes:				110

**Table 4-3 Source Content Description**

Tag Name	Content Description	Unit	Type	
System	Set to "Manual".		String	21
Creator	Set to "Manual".		String	29
Creator_Version	Set to "01.00"		String	40
Creation_Date	Date/time of creation.	UTC	DateTime	64
Total size for XML FH in bytes:				154

### 4.3.3 MPH

**Table 4-4 Main Product Header of AUX\_PAR\_2A file**

Tag Name	Content Description	Unit	Type	
Main_Product_Header	Root tag for XML format only		Structure	43
Product	Logical file name, i.e. the file name excluding the extension		String	73
Proc_Stage	Processing stage flag: 'N' for nominal processing (quasi-or close to real-time), 'T' for test product, 'R' for reprocessed.		Enum	27
Ref_Doc	Reference document describing the product		String	10
Spare_1			Spare	10
Acquisition_Station	Field left empty.		String	49
Proc_Center	Set to "Local".		String	32
Proc_Time	Set to Creation_Date	UTC	DateTime	53
Software_Ver	Set to "1.00".		String	21
Baseline	Baseline identifier (as provided by the Job Order File)		String	51
Spare_2			Spare	10
Sensing_Start	Set to Validity_Start thereby omitting the micro seconds part.	UTC	DateTime	61
Sensing_Stop	Set to Validity_Stop thereby omitting the micro seconds part.	UTC	DateTime	59
Spare_3			Spare	10
Phase	Phase number. If not used set to 'X'		Enum	16





Cycle	Cycle number		IntAuc	19
Rel_Orbit	Start relative orbit number		IntAs	29
Abs_Orbit	Start absolute orbit number		IntAs	29
State_Vector_Time	Time of state vector	UTC	DateTime	69
Delta_UT1	Delta_UT1 = UT1-UTC	s	FAdo06	40
X_Position	X position in Earth-fixed reference	m	FAdo73	32
Y_Position	Y position in Earth-fixed reference	m	FAdo73	32
Z_Position	Z position in Earth-fixed reference	m	FAdo73	32
X_Velocity	X velocity in Earth-fixed reference	m/s	FAdo46	34
Y_Velocity	Y velocity in Earth-fixed reference	m/s	FAdo46	34
Z_Velocity	Z velocity in Earth-fixed reference	m/s	FAdo46	34
Vector_Source	Source of orbit vectors (not used by ADM-Aeolus) , set to "GP".		String	33
Spare_4			Spare	10
Utc_Sbt_Time	Time corresponding to SBT below (not used by ADM-Aeolus)	UTC	DateTime	59
Sat_Binary_Time	Satellite Binary Time (not used by ADM-Aeolus)		IntAul	46
Clock_Step	Clock step size (not used by ADM-Aeolus)	ps	IntAul	46
Spare_5			Spare	10
Leap_Utc	Time of occurrence of the leap second	UTC	DateTime	51
Leap_Sign	Leap second sign (+001 if positive leap second, -001 if negative)		IntAc	27
Leap_Err	Leap second error. '1' if leap second error occurs during processing segment, '0' otherwise		Boolean	25
Spare_6			Spare	10
Product_Err	Set to "FALSE".		Boolean	32
Tot_Size	Set to "-1".	bytes	IntAd	37
Sph_Size	Set to "-1".	bytes	IntAl	37
Num_Dsd	Set to "1".		IntAl	21
Dsd_Size	Set to "-1".	bytes	IntAl	38
Num_Data_Sets	Set to "1".		IntAl	33
Spare_7			Spare	10
Total size for XML MPH in bytes				1434

#### 4.3.4 SPH

Table 4-5 Specific Product Header of the AUX\_PAR\_2A file

Name	Description / Comment	Unit	Type	
Specific_Product_Header	Root tag for XML format only.		Structure	45
Sph_Descriptor	Set to "AUX_PAR_2A_SPECIFIC_HEADER".		String	59
List_of_Dsds	List of data set descriptors. See <a href="#">table 49</a> for structure definition		List of 1 Structure	296
Total size for XML SPH in bytes				400

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**Table 4-6 Level 2A List\_of\_Dsds Content Description**

Name	Description / Comment	Unit	Type	XML
Dsd	Data set descriptor. See for structure description.		Structure	267
<b>Total size in bytes</b>				<b>267</b>

**Table 4-7 Dsd Content Description**

Name	Description / Comment	Unit	Type	
Ds_Name	Set to "Level_2A_Proc_Params".		String	39
Ds_Type	Set to "G" for Global Annotation Data Set.		Enum	20
Filename	Set to "Unused".		String	27
Ds_Offset	Set to "1".		IntAd	37
Ds_Size	Set to "1".		IntAul	36
Num_Dsr	Number of data set records in data set.		IntAl	20
Dsr_Size	Set to "1".		IntAl	38
Byte_Order	"3210 for binary DS's to designate byte order is most significant byte first.		String	29
Spare_1			Spare	10
<b>Total size for XML SPH in bytes</b>				<b>256</b>

### 4.3.5 Level 2A Processing Parameters GADS

**Table 4-8 Level 2A Processing Parameters GADS DSR**

Name	Description / Comment	Unit	Type	XML
Level_2A_Processing_Parameters	Root tag.		Structure	65
FH_Default_Fields	Values responsible for populating the fixed header. See table 51 for structure definition.		Structure	336
MPH_Default_Fields	Values responsible for populating the main product header. See table 52 for structure definition		Structure	153
Config_Params	Configurable processing parameters. See table 53 for structure definition.		Structure	4688
System_Params	System set-up parameters. See table 58 for structure definition.		Structure	79
<b>Total size in bytes</b>				<b>5321</b>

**Table 4-9 Level 2A Processing Parameters GADS FH\_Default\_Fields Content Description**

Name	Description / Comment	Unit	Type	XML
File_Description	1-line description of the file		String	53
Notes	Multi-lines free text		String	40
Mission	Set to "Aeolus".		String	25
Mission_Id	Set o "AE".		String	27
File_Class	Set to "TEST".		String	29
File_Version	Set to "0001".		String	33

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System	Set to "Manual".		String	21
Creator	Set to "Manual".		String	29
Creator_Version	Set to "1.00".		String	40
<b>Total size in bytes</b>				<b>297</b>

**Table 4-10 Level 2A Processing Parameters GADS MPH\_Default\_Fields Content Description**

Name	Description / Comment	Unit	Type	XML
Ref_Doc	Reference document describing the product		String	32
Software_Ver	Set to "01.00".		String	43
Proc_Centre	Set to "Local".		String	37
<b>Total size in bytes</b>				<b>112</b>

**Table 4-11 Level 2A Processing Parameters GADS Config\_Params Content Description**

Name	Description / Comment	Unit	Type	XML
SAMS	Structure containing configurable parameters of the Synthetic Accumulated Molecular Signal Construction algorithm. See <a href="#">table 59</a> for structure description.		Structure	513
L2Ap	Structure containing configurable parameters of the L2A processor itself. See <a href="#">table 60</a> for structure description.		Structure	4144
<b>Total size in bytes</b>				<b>4657</b>

**Table 4-12 Level 2A Processing Parameters GADS SAMS Content Description**

Name	Description / Comment	Unit	Type	XML
Wavelength	Laser wavelength.	m	Fadoxy	33
Maximum_Altitude	Altitude up to which AMD profiles are calculated.	m	IntAus	42
Minimum_Altitude	Altitude down to which AMD profiles are calculated.	m	IntAus	42
Altitude_Step	Vertical resolution of the calculation of AMD profiles.	m	IntAus	36
Betam_Factor	Multiplicative factor in the formula to get the molecular backscatter coefficient from atmospheric data.		Fadoxy	37
Reference_Wavelength	Reference wavelength in the formula to get the molecular backscatter coefficient from atmospheric data.	m	Fadoxy	53
Wavelength_Exponent	Exponent of the ratio of wavelengths in the formula to get the molecular backscatter coefficient from atmospheric data.		Fadoxy	53
Reference_Pressure	Reference pressure in the formula to get the molecular backscatter coefficient from atmospheric data.	hPa	IntAus	46
Reference_Temperature	Reference temperature in the formula to get the molecular backscatter coefficient from atmospheric data	K	IntAus	52
MatchAMD	Structure containing the parameters for the algorithm that identifies the AMD profiles that match the L1B measurements. See <a href="#">Table 4-13</a> table for structure description.		Structure	106
<b>Total size in bytes</b>				<b>500</b>

**Table 4-13 Level 2A Processing Parameters GADS MatchAMD Content Description**

Name	Description / Comment	Unit	Type	XML
Earth_Radius	Radius of the blue planet.	m	IntAul	39

Time_Gap_Threshold	Threshold lesser than which the delay between a measurement and an AMD profile must be.	s	IntAus	46
<b>Total size in bytes</b>				<b>85</b>

**Table 4-14 Level 2A Processing Parameters GADS L2Ap Content Description**

Name	Description / Comment	Unit	Type	XML
Quality_Flag	Structure containing the different thresholds used to provide a data quality flag on each of the main L2A optical properties: extinction, backscatter, extinction to backscatter ratio. See table for structure description.		Structure	<b>596</b>
Find_Matching_Bins	Structure containing configurable parameters of the matching bin finder between both channels. See Table 4-16 for structure description.		Structure	99
Feature_Finder	Structure containing configurable parameters of the feature finder. See for structure description.		Structure	2028
SCA	Structure containing configurable parameters of the SCA. See for structure description.		Structure	255
ICA	Structure containing configurable parameters of the ICA. See for structure description.		Structure	486
Trans2LOD	Structure containing configurable parameters of the Trans2LOD. See for structure description.		Structure	199
MCA	Structure containing configurable parameters of the MCA. See for structure description.		Structure	66
Scene_Classification	Structure containing configurable parameters of the scene classification. See for structure description.		Structure	380
<b>Total size in bytes</b>				<b>4109</b>

**Table 4-15 Level 2A Processing Parameters GADS Quality\_Flag Content Description**

Name	Description / Comment	Unit	Type	XML
Mie_Snr_Threshold	Threshold on the Mie SNR to consider the Mie signal as valid		IntAus	41
Rayleigh_Snr_Threshold	Threshold on the Rayleigh SNR to consider the Rayleigh signal as valid		IntAus	49
Mid_Mie_Snr_Threshold	Threshold on the Mie SNR defined on middle bins to consider the Mie signal as valid		IntAus	47
Mid_Rayleigh_Snr_Threshold	Threshold on the Rayleigh SNR defined on middle bins to consider the Rayleigh signal as valid		IntAus	57
Beta_Error_Bar_Threshold	Threshold on the relative error of backscatter retrieval (ratio of the variance of the backscatter coefficient to the backscatter coefficient)	%	IntAus	53
Alpha_Error_Bar_Threshold	Threshold on the relative error of extinction retrieval (ratio of the variance of the extinction coefficient to the extinction coefficient)	%	IntAus	55
Mid_Beta_Error_Bar_Threshold	Threshold on the relative error of backscatter retrieval on middle bins (ratio of the variance of the backscatter coefficient to the backscatter coefficient defined on middle bins)	%	IntAus	61
Mid_Alpha_Error_Bar_Threshold	Threshold on the relative error of extinction retrieval on middle bins (ratio of the variance of the extinction coefficient to the extinction coefficient defined on middle bins)	%	IntAus	63
Total_Optical_Depth_Threshold	Threshold above which we consider that the backscattered signal was totally attenuated by absorption.		IntAus	63
BER_Max_Threshold	Above this value, the BER retrieval is supposed to	sr-1	Fadoxy	39

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	be invalid			
BER_Min_Threshold	Below this value, the BER retrieval is supposed to be invalid	sr-1	Fadoxy	39
<b>Total size in bytes</b>				<b>567</b>

**Table 4-16 Level 2A Processing Parameters GADS Find\_Matching\_Bins Content Description**

Name	Description / Comment	Unit	Type	XML
Altitude_Match_Threshold	Threshold lesser than which the gap between a Rayleigh bin border and a Mie bin border must be for them to match.	m	IntAus	58
<b>Total size in bytes</b>				<b>58</b>

**Table 4-17 Level 2A Processing Parameters GADS Feature\_Finder Content Description**

Name	Description / Comment	Unit	Type	XML
Group_Energy_Threshold	Parameter used to tune the minimum size of groups before they may be nibbled.	J	Fadoxy	58
Gaussian_Mask_Std5	Standard deviation of the smoothing Gaussian mask when it is 5-bin wide, i.e. when the minimum group length is 3.		Fadoxy	49
Gaussian_Mask_Std3	Standard deviation of the smoothing Gaussian mask when it is 3-bin wide, i.e. when the minimum group length is 2.		Fadoxy	49
Emptiness_Betap_Threshold	Value below which it is considered that there is no significant amount of particles.	1/(m*sr)	Fadoxy	63
Negative_Betap_Threshold	Negative value under which fluctuations are considered to be too high, leading to a rejection of the bin.	1/(m*sr)	Fadoxy	61
Nibbling_Threshold	Threshold on the normalised variation of the standard deviation of the smoothed particulate backscatter when attempting to swap a bin between two neighbour groups.	1/(m*sr)	Fadoxy	47
Remove_Group_Relative_Error_Threshold	Threshold on the unsmoothed particulate backscatter relative error, estimated by the error propagation, above which products from a group will be considered untrustworthy and rejected.		Fadoxy	87
Limits_of_Smoothed_Betap_Limits	Distribution of smoothed particulate backscatter standard deviation values in function of the average particulate backscatter of the group. See Table 4-18 for structure description.		List of 14 structures	1532
DSigma_Coefficient	Coefficient to infer a limit to the smoothed particulate backscatter standard deviation variation when adding a bin to a group, making use of the Smoothed_Betap_Limits distribution above.		Fadoxy	49
<b>Total size in bytes</b>				<b>1995</b>

**Table 4-18 Level 2A Processing Parameters GADS List\_of\_Smoothed\_Betap\_Limits Content Description**

Name	Description / Comment	Unit	Type	XML
Smoothed_Betap_Limit	Structure of smoothed betap limits, see Table 4-19 for content description.		Structure	105
<b>Total size in bytes</b>				<b>105</b>

**Table 4-19 Level 2A Processing Parameters GADS Smoothed\_Betap\_Limit Content Description**

Name	Description / Comment	Unit	Type	XML
BetapStd	Smoothed particulate backscatter standard deviation.	1/(m*sr)	Fadoxy	29
BetapMean	Corresponding smoothed particulate backscatter mean.	1/(m*sr)	Fadoxy	31
Total size in bytes				60

**Table 4-20 Level 2A Processing Parameters GADS SCA Content Description**

Name	Description / Comment	Unit	Type	XML
Clear_FMB_Beta_Threshold	Particulate backscatter value below which the first matching bin will be considered empty of any particle, introducing thus no oscillating bias in the extinction retrieval.	1/(m*sr)	Fadoxy	61
Negative_Betap_Threshold	Particulate backscatter value below which the coefficient and its derivatives will be considered invalid and set to -1. Slightly ngative values may be accepted to catch a glimps of the oscillations around zero.	1/(m*sr)	Fadoxy	61
Negative_SLOD_Threshold	SLOD value below which the coefficient and its derivatives will be considered invalid and set to -1. Slightly ngative values may be accepted to catch a glimps of the oscillations around zero.		Fadoxy	59
Negative_Betap_Threshold2	Particulate backscatter value below which thecoefficient and its derivatives will be considered invalid and set to -1. Slightly ngative values may be accepted to catch a glimps of the oscillations around zero.	1/(m*sr)	Fadoxy	63
Total size in bytes				244

**Table 4-21 Level 2A Processing Parameters GADS ICA Content Description**

Name	Description / Comment	Unit	Type	XML
Emptiness_Betap_Threshold	Particulate backscatter value below which it is considered that there is no significant amount of particles. Note that it may be the same as for the feature finder.	1/(m*sr)	Fadoxy	63
Negative_Betap_Threshold	Negative value under which fluctuations are considered to be too high, leading to a rejection of the bin.	1/(m*sr)	Fadoxy	61
List_of_Filling_Cases	Array of the factors enabling case assumption in the equations, see Table 4-22 for structure description		List of 3 structures	296
Credibility_Criterion	Particulate backscatter value below which thecoefficient and its derivatives will be considered invalid and set to -1. Slightly ngative values may be accepted to catch a glimps of the oscillations around zero.		Fadoxy	55
Total size in bytes				475

**Table 4-22 Level 2A Processing Parameters GADS List\_of\_Filling\_Cases Content Description**

Name	Description / Comment	Unit	Type	XML
Filling_Case	Factors for one specific filling case, see Table 4-23 for structure description.		Structure	83
Total size in bytes				83

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**Table 4-23 Level 2A Processing Parameters GADS Filling\_Case Content Description**

Name	Description / Comment	Unit	Type	XML
F1	Factor of the constant member.		Fadoxy	18
F2	Factor of the H function.		Fadoxy	18
F3	Factor of the exponential function.		Fadoxy	18
<b>Total size in bytes</b>				<b>54</b>

**Table 4-24 Level 2A Processing Parameters GADS Trans2LOD Content Description**

Name	Description / Comment	Unit	Type	XML
Iteration_Max	Maximum number of iterations in the iterative estimation of the SLOD.		IntAus	36
Inversion_Tolerance	Maximum gap between the ratio of the normalized two way transmission and the squared transmission from the satellite to the bin and the value resulting of the SLOD estimation.		Fadoxy	51
Asymptotic_Expansion_Limit_Coefficient	Coefficient involved in the determination of the asymptotic expansion to be used in the inversion to get the SLOD. It's value is set to 0.4 and may be static.		Fadoxy	89
<b>Total size in bytes</b>				<b>176</b>

**Table 4-25 Level 2A Processing Parameters GADS MCA Content Description**

Name	Description / Comment	Unit	Type	XML
Low_SR_fine_Threshold	Value below which the SR_fine from L1B data is considered not vali. Note that the default value of 0.75 will obviously lead to quantitatively wrong results, but the shape of the variations may be ept in the calculation thus enabling some interpretation.		Fadoxy	55
<b>Total size in bytes</b>				<b>55</b>

**Table 4-26 Level 2A Processing Parameters GADS Scene\_Classification Content Description**

Name	Description / Comment	Unit	Type	XML
Scattering_Ratio_Cloud_Threshold	Value of the SR above which the presence of a cloud is strongly assumed.		Fadoxy	77
BER_Cloud_Threshold	Value of the BER below which the presence of a cloud is strongly assumed.	1/(m*sr)	Fadoxy	51
Water_Melting_Temperature	Set to 273.15 K for 1 bar pressure.	K	Fadoxy	63
Surfusion_Threshold_Temperature	Temperature down to which supercooled water may be seen in the atmosphere. Set to 233.15 K.	K	Fadoxy	65
Relative_Humidity_Cloud_Threshold	RH value above which the presence of a cloud is strongly assumed. Taking the incertitude of the model, it is set to 0.94.		Fadoxy	79
<b>Total size in bytes</b>				<b>335</b>

**Table 4-27 Level 2A Processing Parameters System\_Params Content Description**

Name	Description / Comment	Unit	Type	XML
Simulated_Data_Flag	Set to <b>TRUE</b> if input L1B product was generated of E2S simulated data.		Boolean	48

Total size in bytes	48
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#### 4.3.6 Size

The size figures given here are just an estimation of the size of the XML file.

**Table 4-28 Overall size of AUX\_PAR\_2A file**

	Section	Format	Size per file
Header	FH	XML	708
	MPH	XML	1434
	SPH	XML	400
	Level_2A_Proc_Params_ADS	XML	5321
Total size in bytes for XML file			7863

#### 4.4 Aerosol Extinction-To-Backscatter Ratio

AUX\_CLM\_L2, see section 5.3 of [RD 1].