



Maintenance and Operations of Earth Observation



Title:	ENVISAT-1 PRODUCTS SPECIFICATIONS VOLUME 1: INTRODUCTION		
Contract Ref.:	ESA/Esrin 19049/05/I-OL		
Document Ref.:	PO-RS-MDA-GS-2009	Issue: 3	Rev.: S
Consortium Ref.:	OSME-DPQC-SEDA-RS-06-0118	Date:	14/09/2006



TITLE: ENVISAT-1 PRODUCTS SPECIFICATIONS
VOLUME 1: INTRODUCTION

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DOCUMENT CATEGORY: Approval Review Information

ESA APPROVAL:

SUMMARY: This document specifies the ENVISAT-1 products.



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CHANGE RECORD

ISSUE	REVISION	DATE	CHANGE STATUS	ORIGIN
1	A	12/01/96	Issue 1	
1	B	16/02/96	<p>SCR #16, CR #16 Issue 1, Revision B</p> <p>Reason for Change:</p> <p>Updated to reflect information in PO-TN-ESA-GS-0381 and to address RIDs of Feb. 2/96 pertaining to the Level 0 structure.</p> <p>MPH, SPH, DSD, and DSR structures modified.</p> <p>Table added showing generalized Level 0 product structure.</p> <p>RIDs Addressed:</p> <p>ESA/0001: FEP header defined ESA/0002: PF-Host time stamp clarified ESA/0004: Processing PCD added ESA/0006: AF PCD ADS and DSD added ESA/0007: page A-3 updated ESA/0008: page B-3 updated ESA/0009: Table 8.1.1 modified ESA/0011: TBD changed to Range/Doppler ESA/0013: FEP header defined ESA/0014: Table 8.4.7.4-2 corrected CSF/1: filename in MPH corrected CSF/2: page A-3 updated CSF/3: MPH PCD information updated</p>	



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ISSUE	REVISION	DATE	CHANGE STATUS	ORIGIN
			CSF/5: DSD added to Level 0 SPH CSF/6: Section on AATSR updated and re-issued CSF/8: AATSR_O Summary Sheet updated	
1	C	04/04/96	SCR #38, CR #38 Issue 1, Revision C Reason for Change: Updated Sections 1-6, 17 and Annex A to reflect changes discussed at the Products Review Meeting #1, March 5-8, 1996, as per action item "AI MDA 6 April 96" from PO-MN-ESA-00416, Pg. 35.	Products Review Meeting #1
2	A	20/05/96	SCR #71, CR #71 Issue 2 Separate volume created. Minor updates added.	
2	B	10/10/96	SCR #102, CR #102 Issue 2, Revision B Updated with new acronyms and reference documents.	
3	A	10/02/97	SCR #133, CR #133 Issue 3 Reason for Change: Updated in response to ESA RIDs received 06/01/97.	ESA RIDs
3	B	27/05/97	SCR #169, CR #169 Issue 3, Revision B Reason for Change:	Products Review Meeting #3



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ISSUE	REVISION	DATE	CHANGE STATUS	ORIGIN
			Corrected document reference. Updated Document Status table.	
3	C	19/06/97	SCR #169, CR #169 Issue 3, Revision C Reason for Change: Updated Document Status table.	
3	D	15/10/97	SCR #169, CR #169 Issue 3, Revision D Reason for Change: Updated Document Status table.	
3	E	09/02/98	SCR #169, CR #169 Issue 3, Revision E Reason for Change: Updated Document Status table.	
3	F	20/03/98	SCR #169, CR #169 Issue 3, Revision F Reason for Change: Updated Document Status table.	
3	G	01/05/98	SCR #169, CR #169 Issue 3, Revision G Reason for Change: Updated Document Status table.	
3	H	11/07/98	SCR #169, CR #169 Issue 3, Revision H Reason for Change: Updated Document Status table, and Reference document list. Some SCIAMACHY acronyms added to Acronyms and Abbreviations list.	



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ISSUE	REVISION	DATE	CHANGE STATUS	ORIGIN
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3	J	30/10/98	SCR #218, CR #218 Issue 3, Revision J Reason for Change: Updated Document Status table.	
3	K	13/12/98	SCR #218, CR #218 Issue 3, Revision K Reason for Change: Updated Document Status table.	
3	L	30/10/99	Issue 3, Revision L Reason for Change: Updated Document Status table.	
3	M	30/11/99	Issue 3, Revision M Reason for Change: Updated Document Status table.	
3	N	30/05/01	SCR #218, CR #218 Issue 3, Revision N Update Document Status table.	
3	P	26/9/2001	Update Document Status table Note: no revision O issued to avoid misinterpretation with a zero.	
3	Q	23/03/06	Update Document Status table	
3	R	24/04/06	Update Document Status table	

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<u>3</u>	<u>S</u>	<u>14/09/06</u>	<u>Update Document Status table</u>	

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REGISTER OF CHANGES

Affected pages:

page 12 : Document status table.



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1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

The purpose of this document is:

- ❑ to provide specifications for the ENVISAT-1 products which will be generated by the PDS;
- ❑ to provide a vehicle for review, consolidation and rationalization of various versions of product definitions as they become available.

This is a living document. The products specifications presented here are those based on instrument information supplied so far. Parameters and values given in this document may change as the ground segment processing becomes better defined. Areas that remain to be defined are identified and indicate what work still needs to be done in order to complete this document.

1.2 SCOPE OF THE DOCUMENT

This document summarizes the specifications for ENVISAT-1 core ESA products. This includes all products produced in the ENVISAT-1 Ground Segment, in the Payload Data Handling Stations (PDHS) as well as some products produced in ESA Off-line processing facilities associated with the Low Rate Reference Archive Center (LRAC), in the National Stations providing ESA-type services (NS-E) and the National Processing and Archiving Centers (PACs). It also defines the structure of auxiliary data sets which are used to make products.

The primary focus of the document is to provide details of product structures and contents. A brief list of algorithms used to produce an individual product may be provided, but detailed algorithm descriptions are beyond the scope of this document. The Product Specifications are valid when the products are output from PDHS LRAC or PACs, but not necessarily as they are being processed and passed between systems internal to a site. At these internal interfaces the products may not be complete or meet all specifications.



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1.3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

The official acronym list for all PDS documentation is contained in PO-LI-CSF-GS-0012.

In addition, the following acronyms and abbreviations are defined:

AAIA	Absorbing Aerosol Indicator Algorithm (SCIAMACHY)
AC	Across Track
ADC	Analog-To-Digital Converter
ADS	Auxiliary Data Set
ADU	Analog to Digital Unit
AGC	Automatic Gain Control (RA-2)
AISP	Annotated Instrument Source Packet
AL	Along Track
AMF	Air Mass Factor (SCIAMACHY)
AOCS	Attitude and Orbit Control (sub)System (MERIS)
AP	Alternating Polarization
API	Application Process Identifier
ARVI	Atmospherically Robust Vegetation Index (MERIS)
ASCII	American Standard Code for Information Interchange
ASM	Azimuth Scan Mirror (SCIAMACHY)
ASU	Azimuth Scan Unit (MIPAS)
BB	Black Body
BCPS	Broadcast Pulse Signal (SCIAMACHY)
BD_LEN	Band Length (MERIS)
BD_POS	Band Position (MERIS)
BIAS	Basic Infra-red Absorption Spectroscopy (SCIAMACHY)
BITE	Built In Test Equipment (RA-2)
BOA	Bottom of Atmosphere
BOAVI	BOA Vegetation Index (MERIS)
BRDF	Bi-directional Reflectance Distribution Function (MERIS)



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BPDF	Bi-directional Scattering Distribution Function (SCIAMACHY)
BT	Brightness Temperature
BUFR	Binary Universal Form for meteorological data
CBB	Calibration Blackbody (MIPAS)
CBE	CBB Electronics (MIPAS)
CCD	Charge Coupled Device
CW	Continuous Wave (ASAR)
DDT	Data Dictionary Tool
DEM	Digital Elevation Model
DET	Detection Phase (RA-2)
DFT	Discrete Fourier Transform
DMS	Data Measurement Set
DOAS	Differential Optical Absorption Spectroscopy (SCIAMACHY)
DS	Data Set
DSD	Data Set Descriptor
DTU	Detector Unit (MIPAS)
ECMWF	European Center for Medium-range Weather Forecasts
EIH	Extracted Instrument Header
ESM	Elevation Scan Mirror (SCIAMACHY)
ESU	Elevation Scan Unit (MIPAS)
FBAQ	Flexible Block Adaptive Quantization (ASAR)
FCE	Fringe Count Error (MIPAS)
FE	Fixed Exponent Quantization (ASAR)
FEO	Front End Optics (MIPAS)
FHPBW	Full Half Power Bandwidth (MIPAS)
FIR	Finite Impulse Response
FM	Frequency Modulation (ASAR)



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FM	Flight Model (SCIAMACHY)
FOV	Field Of View
FPA	Focal Plane Array (SCIAMACHY)
FPN	Fixed Pattern Noise (SCIAMACHY)
FR	Full Resolution (MERIS)
FWHM	Full Width at Half Maximum
GADS	Global Annotation Data Set
GEC	Geocoded Image (ASAR)
GM	Global Monitoring Mode (ASAR)
GRIB	Gridded Binary Format (meteorological data interchange format)
GSRT	Ground segment Reference Time
HEX	Hexadecimal Number Representation
HH	Horizontal Polarization Transmitted/ Horizontal Polarization Received (ASAR)
HKTMML	House Keeping Telemetry Data
HV	Horizontal Polarization Transmitted/ Vertical Polarization Received (ASAR)
HWHM	Half Width at Half Maximum
ICU	Instrument Control Unit
ID	Identifier
IDEFOV	Instantaneous Detector Element Field of View
IF	Intermediate Frequency
I/F	Interface
IFOV	Instantaneous Field of View
IGM	Interferogram (MIPAS)
ILS	Instrument Line Shape
IM	Image Mode (ASAR)
kB	kiloBytes (also: kBytes)



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LADS	Location ADS
LMA	Levenburg-Marquardt Algorithm (GOMOS)
LOS	Line Of Sight (MIPAS)
LSB	Least Significant Bit (or Byte, depending on context)
LSW	Least Significant Word
LUT	Look-Up Table
LVI	Live Vegetation Index
MB	MegaBytes
MJD	Modified Julian Day
MSB	Most Significant Bit (or Byte, depending on context)
MSW	Most Significant Word
MTF	Modulation Transfer Function
N/A	Not Applicable
NDVI	Normalized Difference Vegetation Index (MERIS)
NEDL	Noise Equivalent Differential Radiance (MERIS)
NESR	Noise Equivalent Spectral Radiance
NPE	Noise Power Estimate Phase (RA-2)
NRT	Near Real Time
OBDH	On-Board Data Handling
OBR	On-Board Recorder
OBT	On-Board Time
OFL	Off-line
OPD	Optical Path Difference (MIPAS)
PAR	Photosynthetically Active Radiation
PAW	Preamplifier Warm Stage (MIPAS)
PET	Pixel Exposure Time (SCIAMACHY)



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PGICD	Payload to Ground Segment Interface Control Document
PMD	Polarization Measurement Device (SCIAMACHY)
PPG	Pixel to Pixel Gain (SCIAMACHY)
PRF	Pulse Repetition Frequency (ASAR/RA-2)
PRI	Precision Image (ASAR) or Pulse Repetition Interval (ASAR/ RA-2)
PRT	Probe Resistive Temperature (MIPAS)
PTR	Pulse Target Response (RA-2), Point Target Response (ASAR)
RBDF	Radiometric bi-directional factor (MERIS)
R/D	Range/Doppler SAR Algorithm (ASAR)
RF	Radio Frequency
RFOV	Reduced Field of View
RR	Reduced Resolution
SAR	Synthetic Aperture Radar (ASAR)
SATU	Star Acquisition and Tracking Unit (GOMOS)
SBT	Satellite Binary Time
SDP	Spectral Data Points (MIPAS)
SDPU	Signal Data Processing Unit (SCIAMACHY)
SDPSS	Science Data Processing Subsystem (MERIS)
SFA	Steering Front Assembly
SLC	Single Look Complex Image (ASAR)
SLS	Spectral Light Source (SCIAMACHY)
SNR	Signal-to-Noise Ratio
SPE	Signal Processing Electronics (MIPAS)
SPECAN	Spectral Analysis SAR Algorithm (ASAR)
SRBDF	Spectral radiometric bi-directional factor (MERIS)
SS	Sub Swath
SWH	Significant Wave Height (RA-2)



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SZA	Sun Zenith Angle
TBC	To Be Confirmed
TBD	To Be Defined
TOA	Top of Atmosphere
TOAR	TOA Radiance (MERIS)
TOAVI	TOA Vegetation Index
TOMS	Total Ozone Mapping Spectrometer
USO	Ultra Stable Oscillator
UTM	Universal Transverse Mercator
UV	Ultra-Violet
VCDU	Virtual Channel Data Unit
VEU	Video Electronics Unit (MERIS)
VH	Vertical Polarization Transmitted/ Horizontal Polarization Received (ASAR)
VMR	Volume Mixing Ratio
VV	Vertical Polarization Transmitted/ Vertical Polarization Received (ASAR)
WGS84	World Geodetic System 1984
WLS	White Light Source (SCIAMACHY)
WS	Wide Swath Mode (ASAR)
WV	Wave Mode (ASAR)
ZPD	Zero Path Difference (MIPAS)



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1.4 APPLICABLE AND REFERENCE DOCUMENTS

1.4.1 Applicable Documents

Document Title	Identifier	Intern. Ref.
Payload to Ground Segment Interface Control Document. Issue 3.0. Jan. 14, 1997.	PO-ID-DOR-SY-0032	A-1
ENVISAT-1 PDS Glossary and Abbreviation List. Issue 6. Rev. B. April 28, 1997.	PO-LI-CSF-GS-0012	A-2
ITT Appendix 1 - Annex D. Issue 4.1. Oct. 15, 1997), chapter 4.2.	PO-RS-ESA-GS-0239	A-3
Subcontract for ENVISAT-1 Ground Segment/Payload Data Segment Data Segment Development - System Engineering Support. Nov. 8, 1996.	PO-CO-CSF-GS-0774	A-4

1.4.2 Reference Documents

Document Title	Identifier	Intern. Ref.
ENVISAT-1 Product Format Guidelines.	PO-TN-ESA-GS-0242	R-1
ENVISAT Product Definition Guidelines.	PO-TN-ESA-GS-0231	R-2
ENVISAT-1 Product Specifications.	PO-RS-MDA-GS-002	R-3
ENVISAT-1 Product Specifications.	PO-PD-CSF-GS-0050	R-4
ENVISAT-1 ASAR Interpretation of Source Packet Data.	PO-TN-MMS-SR-0248	R-5
PDS Architecture Technical Description.	PO-DD-CSF-GS-0047	R-6



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ENVISAT-1 PDS Level 0 Product Specification.	PO-TN-ESA-GS-0381	R-7
ERS Ground Stations Product Specification.	ER-IS-EPO-GS-0201	R-8
ENVISAT Ground Segment ASAR Product Specifications.	PO-RS-ESA-GS-0162	R-9
ASAR Products Technical Note.	PO-TN-CSF-GS-0055	R-10
MERIS Product Definition Guidelines.	PO-TN-ESR-GS-0028	R-11
ERS-1 SAR Products Computer Compatible Tape Format Specification.	ER-IS-EPO-GS-0506	R-12
Envisat PDS Level 0 Product List.	PO-TN-ESA-GS-00421	R-13
MERIS Input/Output Data Definition.	PO-TN-MEL-GS-0003	R-14
Envisat -1 RA-2 and MWR Products Specification.	PO-TN-ESA-GS-0178	R-15
MIPAS Input/Output Data Definition.	PO-TN-BOM-GS-0010	R-16
MIPAS Level 2 Processing Input / Output Data Definition.	PO-RS-ESA-GS-0177	R-17
Technical Note on the ASAR Products Structures.	PO-TN-MDA-GS-2068	R-18
GOMOS Input / Output Data Definition.	PO-RS-ACR-GS-0003	R-19
DMA Technical Report "Department of Defense World Geodetic System 1984. Its definition and relationships with local geodetic systems".	DMA-TR-8350.2	R-20
World Meteorological Organization Manual on Codes. No. 306, 1988.	-	R-21
GOMOS Level 1B Detailed Processing Model.	PO-RS-ACR-GS-0001	R-22
GOMOS Level 2 Detailed Processing Model.	PO-RS-ACR-GS-0002	R-23



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MIPAS Level 1B Detailed Processing Model	PO-RP-BOM-GS-003	R-24
Meteo Products	PO-TN-ESA-GS-00462	R-25
Technical Note on the ASAR Wave Mode Product Structures	PO-TN-ESA-GS-0449	R-26
Child Product Extraction Technical Note	PO-TN-ESA-GS-0776	R-27
Meteorological Bulletin Encoding and Decoding GRIB Data	-	R-28
Binary Data Representation FM 92 GRIB, May 1992.	-	R-29
MWR Algorithm Specifications for Level 1B Software Prototyping.	TNO/RAS/0010/ALS	R-30
RA-2 Algorithm Specifications for Level 1B Software Prototyping.	TNO/RAS/0018/ALS	R-31
MERIS Level 1 Detailed Processing Model.	PO-TN-MEL-GS-0002	R-32
MERIS Level 2 Detailed Processing Model.	PO-TN-MEL-GS-0006	R-33
Tables Generation Requirements Document.	PO-TN-MEL-GS-0012	R-34
SCIAMACHY Level 0 to Level 1b Processing, Input/Output Data Definition	ENV-TN-DLR-SCIA-0005	R-35
SCIAMACHY Level 1b to Level 2 NRT Processing, Input/Output Data Definition	ENV-TN-DLR-SCIA-0010	R-36



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1.5 DOCUMENT OVERVIEW

The document has been subdivided into several volumes. Each volume contains a separate table of contents and change record. Volumes will be updated individually as information becomes available.

- ❑ Volume 2 presents a summary of the instruments that will be carried by the ENVISAT-1 Payload Data Segment.
- ❑ Volume 3 contains an introduction to the terms and definitions used to specify the ENVISAT products.
- ❑ Volume 4 provides an overview of the core ENVISAT products including a description and naming conventions.
- ❑ Volume 5 provides physical format and structural information common to all products.
- ❑ Volume 6 describes the Level 0 product common to all instruments.
- ❑ Volume 7 contains specifications for AATSR.
- ❑ Volume 8 contains specifications for ASAR.
- ❑ Volume 9 contains specifications for DORIS.
- ❑ Volume 10 contains specifications for GOMOS.
- ❑ Volume 11 contains specifications for MERIS.
- ❑ Volume 12 contains specifications for MIPAS.
- ❑ Volume 13 contains specifications for MWR.
- ❑ Volume 14 contains specifications for RA-2.
- ❑ Volume 15 contains specifications for SCIAMACHY.
- ❑ Volume 16 contains the specifications for auxiliary data files used to produce products.
- ❑ Volume 17 provides the specifications for extracted instrument header products.
- ❑ Volume A contains a summary of the numerous data types and conventions used within the document.

Thus, an instrument processor contractor should be provided with Volumes 1-6, plus the volume for the instrument in question, plus Volumes 16 and A.



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Title:	ENVISAT-1 PRODUCTS SPECIFICATIONS VOLUME 1: INTRODUCTION		
Contract Ref.:	ESA/Esrin 19049/05/I-OL		
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Consortium Ref.:	OSME-DPQC-SEDA-RS-06-0118	Date:	14/09/2006



1.6 DOCUMENT STATUS

The following table specifies the current Issue and Revision of each volume of this document.

Table 1-1 Volume Status

Volume Number and Title	Issue	Revision	Date
1 - Introduction	3	S	14/09/06
2 - Overview of Instruments	3	A	19/06/97
3 - Product Terms and Definitions	3	A	10/02/97
4 - Products Overview	3	C	20/11/00
5 - Product Structures	3	C	16/10/98
6 - Level 0 Products Specifications	3	C	16/10/98
7 - AATSR Products Specifications	3	H	27/01/04
8 - ASAR Products Specifications	4	A	11/05/04
9 - DORIS Products Specifications	3	A	16/10/98
10 - GOMOS Products Specifications	3	I	01/02/05
11 - MERIS Products Specifications	5	A	09/03/06
12 - MIPAS Products Specifications	3	I	24/03/03
13 - MWR Products Specifications	2	B	17/03/97
14 - RA-2 Products Specifications	3	N	5/06/06
15 - SCIAMACHY Products Specifications	3	K	24/04/06
16 - Auxiliary Data Files	3	F	15/06/05
17 - Extracted Instrument Headers	3	A	10/02/97
A - Product Data Conventions	3	E	20/06/05

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1.7 AUDIENCE

This document is intended to provide information to ESA and contractors for implementation purposes. This document is not intended as an end-user document.



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