Standard Archive Format for Europe

Mission Specialisation Control Book

ENVISAT

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1. Introduction

1.1. Purpose and scope

The present document is part of the Standard Archive Format for Europe specialisation for ENVISAT (SAFE Specialisation for ENVISAT). This specialisation consists of the following set of documents:

- the current book, which is the ENVISAT mission specialisation control book, and is the top-level document of the specialisation, containing all the information that is common to all SAFE ENVISAT products.
- one ENVISAT product specialisation control book for Level-0 products.

The current version of the document provides detailed information for ASAR instrument (processing chain, metadata and SAFE packages). This information will be augmented with the rest of ENVISAT's instruments in further versions.

1.2. Book Organisation

The ENVISAT mission specialisation control book is organized as follows:

Chapter 1: Introduction	Introductory part of the document.
Chapter 2: General Description	Overall description of the mission, instruments and products generated for each processing level in scope of this specialisation.
Chapter 3: Error: Reference source not found	SAFE ENVISAT metadata specialisation.
Chapter 4: Naming Conventions	SAFE ENVISAT package names and URN specifications.
Appendix A: Representation Information Packages	List of SAFE ENVISAT Representation Information Packages characteristic of the specialisation.
Appendix B: Representation Information Packages	List of SAFE ENVISAT EO Product Packages examples.

1.3. Specialisation Volume Set

The following list references the documents that constitute the SAFE ENVISAT specialisation volume set.

[ENVISAT-BOOK-MISSION]	ENVISAT Mission Specialisation (PDGS-SAFE-GMV-ENVISAT-MISSION)
[ENVISAT-BOOK-L0]	ENVISAT Specialisation for Level 0 products (PDGS-SAFE-GMV-ENVISAT-L0)

The specialised SAFE ENVISAT Representation Information Packages and examples of SAFE ENVISAT EO Product/Auxiliary Packages are also considered part of the present specialisation and are provided alongside the documents as separate files. The complete file list is described in Appendix A and Appendix B.

1.4. Bibliography

[OAIS-RM] *Reference Model for an Open Archival Information System (OAIS)* - 650.0-B-1- January 2002- Blue Book- Copyright © 2002 Consultative Committee for Space Data Systems (CCSDS) -

[OGC EOP O&M] *Earth Observation Metadata profile of Observations & Measurements* – OGC 10-157r3 version 1.0 (Publication Date: 2012-06-12) Copyright © 2012 Open Geospatial Consortium -with the following set of approved Change Requests:

- *Change proposal: EO PMOS SWG Improved expression of EO product quality and status information, OGC 13-085*
- *Change Proposal: EO PMOS SWG Addition of optional group identificator, OGC 13-086*
- *Change Proposal: EO PMOS SWG Improve the description of EO Product Masks, OGC 13-087*
- *Change Proposal: EO PMOS SWG Correct inconsistencies between UML model and tables, OGC 13-088*
- *Change Proposal: EO PMOS SWG Improved way of expressing the timeliness of EO Product acquisition and processing, OGC 13-093*
- *Change Proposal: EO PMOS SWG Add optional elements referring to products instead of images, OGC 13-094*
- *Change Proposal: EO PMOS SWG Replace example of EO Product Metadata extension, OGC 13-098*
- *Change Proposal: EO-PMOS Corrections related to the implementation of the eoptype attribute, OGC 14-031*
- *Change Proposal: EO-PMOS Addition of optional elements creationDate and modificationDate, OGC 14-032*

[SAFE_CORE] *Standard Archive Format for Europe - Control Book - Volume 1 - Core Specifications* - PGSI-GSEG-EOPG-FS-05-0001- v2.3-

[SAFE_REC_SPEC] *Standard Archive Format for Europe - Control Book - Volume 2 - Recommendations for Specialisations* - PGSI-GSEG-EOPG-FS-05-0002- v2.3-

[SI] *The International System of Units (SI)* - 1998- 7th edition- Bureau International des Poids et Mesures - Copyright © 1998 Organisation

Intergouvernementale de la Convention du Mètre -

[SI-SUP2000] *The International System of Units (SI)*- Supplement 2000: addenda and corrigenda of the 7th edition (1998) - 1998- 7th edition- Bureau International des Poids et Mesures – Copyright © 1998 Organisation Intergouvernementale de la Convention du Mètre -

[XFDU] *XML Formatted Data Unit (XFDU) - Structure and Construction Rules* - 661.0-B-1- September 2008- Blue Book - Copyright © 2008 Consultative Committee for Space Data Systems (CCSDS) -

1.5. Glossary of Terms

1.5.1. Definitions

1.5.1.1. General

Auxiliary data	All data used to generate a product, other than the direct measurements of the instrument. EO Auxiliary data include calibration data measured on-board that are not part of the main measurements of the instrument, external calibration files from sources other than the satellite, processor configuration files, and any other files needed by instrument processors.
Auxiliary file-type	A file type that characterizes all EO Auxiliary files sharing common representation information.
EO Product	The result of the processing of remote sensing data. Earth Observation products are specific to each mission and sensor combination. A data product can be an entire acquisition strip (the data segment continuously acquired by a ground station) or a single frame (a subset of the acquisition strip of standard length as defined by the WRS).
Manifest	A document containing metadata about Components, and the relationships among them. This information is stored as a Component, using an XML language designed for just this purpose. [XFDU].
Metadata	Data about other Data [OAIS-RM].
Metadata file	A file containing the Metadata associated to an EO Product or EO Auxiliary file.
Product-type	A file type that characterizes all the EO Product files sharing common representation information.
SAFE Package	An XFDU Package specialised for Earth Observation data purposes. In previous versions of SAFE, the term SAFE product was used instead because the content information was limited to Earth Observation products. It has been replaced by SAFE Package because the types of Content Information described by SAFE are not only Earth Observation products, but also Representation Information files and EO Auxiliary files.
SAFE Specialisation	A SAFE Specialisation is a restriction of the SAFE Core specifications for a more specific type of data. Examples of SAFE Specialisation include specialisations for ENVISAT or LANDSAT Products, for CCSDS Telemetry Data, or for SPOT Measurements.
XFDU Package	A Package Interchange File that contains an XFDU Manifest and is conforming to the semantics specified in the XFDU Specifications. An XFDU Package is a specialization of Package Interchange File [XFDU].

1.5.2. Acronyms and Abbreviations

1.5.2.1. General

CCSDS	Consultative Committee for Space Data Systems
EO	Earth Observation
ESA	European Space Agency
GML	Geography Mark-up Language
ISO	International Organization for Standardization
MMCC	Mission Monitoring and Control Center
O&M	Observations and Measurements
OAIS(-RM)	Reference Model for an Open Archival Information System
OGC	Open Geospatial Consortium
SAFE	Standard Archive Format for Europe
SI	The International System of Units
URN	Uniform Resource Name
WRS	World Reference System
XFDU	XML Formatting Data Unit
XML	eXtensible Mark-up Language

1.5.2.2. Specialisation

AATSR	Advanced Along Track Scanning Radiometer
ASAR	Advanced Synthetic Aperture Radar
DORIS	Doppler Orbitography and Radio-positioning Integrated by Satellite
ENVISAT	Environmental Satellite
GOMOS	Global Ozone Monitoring by Occultation of Stars
ICD	Interface Control Document
MERIS	MEdium Resolution Imaging Spectrometer
MIPAS	Michelson Interferometer for Passive Atmospheric Sounding
MWR	MicroWave Radiometer
PDS	Payload Data Segment
RA-2	Radar Altimeter 2
S/C	Spacecraft
SCIAMACHY	SCanning Imaging Absorption SpectroMeter for Atmospheric CHartographY

1.5.3. Conventions Used

The present book assumes that all physical quantities are expressed according to a standard system of units. The selected standard is the SI defined by the Bureau International des Poids et Mesures (BIPM) in documents [SI] and [SI-SUP2000].

2. General Description

2.1. Mission Overview

ENVISAT was ESA's successor to ERS. ENVISAT was launched in 2002 with 10 instruments aboard and at eight tons is the largest civilian Earth observation mission.

ENVISAT was a polar-orbiting Earth observation satellite which provided measurements of the atmosphere, ocean, land, and ice.

The main objective of the ENVISAT programme was to endow Europe with an enhanced capability for remote sensing observation of Earth from space, with the aim of further increasing the capacity of participating states to take part in the studying and monitoring of the Earth and its environment.

The mission intended to continue and improve upon measurements initiated by ERS-1 and ERS-2, and to take into account the requirements related to the global study and monitoring of the environment.

Mission details	Launched: 1 March 2002 End of operations: 9 May 2012
Mission objectives:	Primary objectives • to provide for continuity of the observations started with the ERS satellites, including those obtained from radar-based observations; • to enhance the ERS mission, notably the ocean and ice mission; • to extend the range of parameters observed to meet the need of increasing knowledge of the factors determining the environment; • to make a significant contribution to environmental studies, notably in the area of atmospheric chemistry and ocean studies (including marine biology). Secondary objectives: • to allow more effective monitoring and management of the Earth's resources; • to better understand solid Earth processes.
Mission orbit:	ENVISAT flies in a sun-synchronous polar orbit of about 800-km altitude. Orbits per Day: 14 11/35; Repeat Cycle (days): 35; Orbits in Cycle: 501; Orbit Period (min): 100.59: MLST at descending node: 10:00; Inclination (deg): 98.55; Semi-Major Axis [Orbit Radius] (km): 7159.5; Orbit Velocity (km/s): 7.45; Mean Altitude (km): 799.8; Orbital Altitude Range (km): 780 - 820
Configuration:	Launch configuration: Dimensions Launch Configuration: length 10.5 m, envelope diameter 4.57m In-Orbit configuration : 26m *10m * 5m Mass Budget Total satellite mass = 8211 kg Average Power: Total Load: 3560 W (Sunlight) ; 3097 W (Eclipse) System Capability: 3847 W (Sunlight) ; 3291 W (Eclipse)
Payload	**ASAR**: (Advanced Synthetic Aperture Radar) **MERIS**: (MEdium Resolution Imaging Spectrometer)

	AATSR: (Advanced Along Track Scanning Radiometer) **RA-2**: (Radar Altimeter 2) **MWR**: (MicroWave Radiometer) **GOMOS** (Global Ozone Monitoring by Occultation of Stars) **MIPAS** (Michelson Interferometer for Passive Atmospheric Sounding) **SCIAMACHY** (SCanning Imaging Absorption SpectroMeter for Atmospheric CHartographY) **DORIS** (Doppler Orbitography and Radio-positioning Integrated by Satellite)
Launch	The ENVISAT satellite was launched on March 1, 2002 aboard an Ariane 5 from the Guyana Space Centre in Kourou.

Table 1: ENVISAT Mission summary

2.2. Instrument Overview

2.2.1. ASAR

An Advanced Synthetic Aperture Radar (ASAR), operating at C-band, ASAR ensures continuity with the image mode (SAR) and the wave mode of the ERS-1/2 AMI. It features enhanced capability in terms of coverage, range of incidence angles, polarisation, and modes of operation. This enhanced capability is provided by significant differences in the instrument design: a full active array antenna equipped with distributed transmit/receive modules which provides distinct transmit and receive beams, a digital waveform generation for pulse "chirp" generation, a block adaptive quantisation scheme, and a ScanSAR mode of operation by beam scanning in elevation.

Type	Imaging microwave radars
Technical Characteristics	
Accuracy	Radiometric resolution in range: 1.5-3.5 dB, Radiometric accuracy: 0.65 dB
Spatial resolution	Image, Wave and Alternating Polarisation modes: approx 30m x 30m.Wide Swath mode: approx 150m x 150m. Global Monitoring mode: approx1000m x 1000m.
Swath width	Image and alternating polarisation modes: up to 100km, Wave mode:5km, Wide swath and global monitoring modes: 400km or more.
Waveband	Microwave: C-band, with choice of 5 polarisation modes (VV, HH,VV/HH, HV/HH, or VH/VV)
Earth Topics	Land (Landscape Topography), Snow and Ice (Snow and Ice), Ocean and Coast (Ocean Currents and Topography)
Related Instruments	SAR, L-band SAR, PALSAR, RLSBO, SAR (RADARSAT), SAR (RADARSAT-2), SAR (SAOCOM), TerraSAR-X

Table 2: ASAR Instrument summary

2.2.2. MERIS

MERIS is a programmable, medium-spectral resolution, imaging spectrometer operating in the solar reflective spectral range. Fifteen spectral bands can be selected by ground command.

The instrument scans the Earth's surface by the so called "push-broom" method. Linear CCD arrays provide spatial sampling in the across-track direction, while the satellite's motion provides scanning in

the along-track direction.

MERIS is designed so that it can acquire data over the Earth whenever illumination conditions are suitable. The instrument's 68.5° field of view around nadir covers a swath width of 1150 km. This wide field of view is shared between five identical optical modules arranged in a fan shape configuration.

Type	Imaging multi-spectral radiometers (vis/IR)
Technical Characteristics	
Accuracy	Ocean colour bands typical S:N = 1700
Spatial resolution	Ocean: 1040m x 1200 m, Land & coast: 260m x 300m
Swath width	1150km, global coverage every 3 days
Waveband	VIS-NIR: 15 bands selectable across range: 390 nm to 1040 nm(bandwidth programmable between 2.5 and 30 nm)
Earth Topics	Land (Vegetation), Ocean and Coast (Ocean Colour/Biology), Atmosphere (Clouds/Precipitation)
Related Instruments	AATSR, ATSR, ABI, AVHRR/2, AVHRR/3, Imager (INSAT), MODIS-Aqua, MODIS-Terra, VHRR, W iFS, MSS

Table 3: MERIS Instrument summary

2.2.3. *AATSR*

Advanced Along-Track Scanning Radiometer (AATSR) is one of the Announcement of Opportunity (AO) instruments on board the European Space Agency (ESA) satellite ENVISAT. It is the most recent in a series of instruments designed primarily to measure Sea Surface Temperature (SST), following on from ATSR-1 and ATSR-2 on board ERS-1 and ERS-2. AATSR data have a resolution of 1 km at nadir, and are derived from measurements of reflected and emitted radiation taken at the following wavelengths: 0.55 µm, 0.66 µm, 0.87 µm, 1.6 µm, 3.7 µm, 11 µm and 12 µm.

Special features of the AATSR instrument include its use of a conical scan to give a dual-view of the Earth's surface, on-board calibration targets and use of mechanical coolers to maintain the thermal environment necessary for optimal operation of the infrared detectors.

Type	Imaging multi-spectral radiometers (vis/IR) & Multipledirection/polarisation radiometers
Technical Characteristics	
Accuracy	Sea surface temperature: <0.5K over 0.5 deg x 0.5 deg (lat/long)area with 80% cloud cover Land surface temperature: 0.1K (relative)
Spatial resolution	IR ocean channels: 1km x 1km, Visible land channels: 1km x 1km
Swath width	500 km
Waveband	VIS - NIR: 0.555, 0.659, 0.865 micrometers, SWIR: 1.6 micrometers,MWIR: 3.7 micrometers, TIR: 10.85, 12 micrometers
Earth Topics	Land (Vegetation), Ocean and Coast (Sea Surface Temperature), Atmosphere (Clouds/Precipitation)
Related Instruments	MERIS, ATSR, ABI, AVHRR/2, AVHRR/3, Imager (INSAT), MODIS-Aqua,MODIS-Terra, MSS, VHRR, WiFS

Table 4: AATSR Instrument summary

2.2.4. RA-2

Radar Altimeter 2 (RA-2) is an instrument for determining the two-way delay of the radar echo from the

Earth's surface to a very high precision: less than a nanosecond. It also measures the power and the shape of the reflected radar pulses.

It is a nadir-looking pulse-limited radar altimeter based on the heritage of ERS-1 RA functioning at the main nominal frequency of 13.575 GHz (Ku Band), which has been selected as a good compromise between the affordable antenna dimension that provides the necessary gain and the relatively low attenuation which experience the signals propagating through the troposphere.

Type	Radar altimeter
Technical Characteristics	
Accuracy	Altitude: better than 4.5cm, Wave height: better than 5% or 0.25m
Spatial resolution	N/A
Swath width	N/A
Waveband	Microwave: 13.575Ghz (Ku-Band) & 3.2GHz (S-Band)
Earth Topics	Land (Topography/Mapping), Snow and Ice (Sea Ice), Ocean and Coast (Ocean Waves , Ocean Currents and Topography), Atmosphere (Winds)
Related Instruments	RA, ALT, POSEIDON, SIRAL, TOPEX

Table 5: RA-2 Instrument summary

2.2.5. MWR

The main objective of the microwave radiometer is the measurement of atmospheric humidity as supplementary information for tropospheric path correction of the radar altimeter signal, which is influenced both by the integrated atmospheric water vapour content and by liquid water. In addition, MWR measurement data are useful for the determination of surface emissivity and soil moisture over land, for surface energy budget, investigations to support atmospheric studies, and for ice characterisation.

The MWR instrument on board Envisat is a derivative of the radiometers used on the ERS-1 and ERS-2 satellites. It is a dual-channel nadir-pointing Dicke-type radiometer, operating at frequencies of 23.8 GHz and 36.5 GHz.

Type	Imaging multi-spectral radiometers (passive microwave)
Technical Characteristics	
Accuracy	Temparature: 2.6K
Spatial resolution	20km
Swath width	20km
Waveband	Microwave: 23.8 and 36.5GHz
Earth Topics	Atmosphere (Atmospheric Temperature)
Related Instruments	MVIRI

Table 6: MWR Instrument summary

2.2.6. GOMOS

GOMOS is a medium resolution spectrometer covering the wavelength range from 250 nm to 950 nm. The high sensitivity requirement down to 250 nm has been a significant design driver leading to an all-reflective optical system design for the UVVIS part of the spectrum and to functional pupil separation between the UVVIS and the NIR spectral regions (thus no dichroic separation of UV). Due to the requirement of operating on very faint stars (down to magnitude 4 to 5), the sensitivity requirement to

the instrument is very high. Consequently, a large telescope (30 cm × 20 cm aperture) had to be used to collect sufficient signal, and detectors with high quantum efficiency and very low noise had to be developed to achieve the required signal to noise ratios.

Type	Atmospheric Chemistry
Technical Characteristics	
Accuracy	Relative spectral accuracy: 0.17 / 0.20 nm in UVVIS (dark / brightlimb typical)
Spatial resolution	N/A
Swath width	N/A
Waveband	Spectrometers: UV-Vis: 248-371nm & 387-693nm,NIR:750-776nm& 915-956nm,Photometers: 644-705nm & 466-528nm
Earth Topics	Atmosphere (Chemistry , Ozone)
Related Instruments	GOME, SCIAMACHY, MIPAS, ACE-FTS, APS, GOME-2, HALOE, MAESTRO, OSIRIS, SABER, SAGE II, SAGE III

Table 7: GOMOS Instrument summary

2.2.7. MIPAS

The Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) MIPAS is a Fourier transform spectrometer for the detection of limb emission spectra in the middle and upper atmosphere. It observes a wide spectral interval throughout the mid infrared with high spectral resolution. Operating in a wavelength range from 4.15 microns to 14.6 microns, MIPAS detects and spectrally resolves a large number of emission features of atmospheric minor constituents playing a major role in atmospheric chemistry. Due to its spectral resolution capabilities and low-noise performance, the detected features can be spectroscopically identified and used as input to suitable algorithms for extracting atmospheric concentration profiles of a number of target species.

Type	Atmospheric Chemistry and Temperature
Technical Characteristics	
Accuracy	Radiometric precision: 685-970cm-1: 1%, 2410 cm-1: 3%
Spatial resolution	Vertical resolution: 3km, vertical scan range 5-150km, Horizontal:3km x 30km, Spectral resolution: 0.035 lines/cm
Swath width	3 x 30 km
Waveband	MWIR-TIR: between 4.15 and 14.6m
Earth Topics	Atmosphere (Ozone , Climate Change/Kyoto , Chemistry , Radiation/Temperature)
Related Instruments	GOME, GOMOS, SCIAMACHY, ACE-FTS, GOME-2, OSIRIS, SABER, SAGE II, SAGE III, SMR

Table 8: MIPAS Instrument summary

2.2.8. SCIAMACHY

SCIAMACHY is an imaging spectrometer whose primary mission objective is to perform global measurements of trace gases in the troposphere and in the stratosphere. The solar radiation transmitted, backscattered and reflected from the atmosphere is recorded at relatively high resolution (0.2 nm to 0.5 nm) over the range 240 nm to 1700 nm, and in selected regions between 2000 nm and 2400 nm. The high resolution and the wide wavelength range make it possible to detect many different trace gases

despite low concentrations (The mixing ratios of most constituents are of the order of 10-6 or less). The large wavelength range is also ideally suited for the detection of clouds and aerosols. SCIAMACHY has three different viewing geometries: nadir, limb, and sun/moon occultation which yield total column values as well as distribution profiles in the stratosphere and (in some cases) the troposphere for trace gases and aerosols.

Type	Atmospheric Chemistry
Technical Characteristics	
Accuracy	Radiometric: <4%
Spatial resolution	Limb vertical 3 x 132km, Nadir horizontal 32 x 215km
Swath width	Limb and nadir mode: 1000km (max)
Waveband	UV-SWIR: 214-334, 300-412, 383-628, 595-812, 773-1063, 971-1773, 1934-2044, and 2259-2386 nm
Earth Topics	Agriculture (Crop Yields), Ocean and Coast (Ocean Colour/Biology and Fisheries), Solid Earth (Geoid), Atmosphere (Ozone)
Related Instruments	GOME, GOMOS, MIPAS

Table 9: SCIAMACHY Instrument summary

2.2.9. DORIS

The Doppler Orbitography and Radio-positioning Integrated by Satellite instrument is a microwave tracking system that can be utilized to determine the precise location of the ENVISAT satellite. Versions of the DORIS instrument are currently flying on the SPOT-2 and Topex-Poseidon missions.

DORIS operates by measuring the Doppler frequency shift of a radio signal transmitted from ground stations and received on-board the satellite. The reference frequency for the measurement is generated by identical ultra-stable oscillators on the ground and on-board the spacecraft.

Currently there are about 50 ground beacons placed around the globe which cover about 75% of the ENVISAT orbit. On board measurements are performed every 7 - 10 seconds. Precise Doppler shift measurements are taken using an S-band frequency of 2.03625 GHz, while a second VHS band signal at 401.25 MHz is used for ionospheric correction of the propagation delay.

On the ground, DORIS data is used to create precise orbit reconstruction models which are then used for all satellite instruments requiring precise orbit position information. In addition, DORIS operates in a Navigator mode in which on-board positioning calculations are performed in real-time and relayed to the ground segment.

Type	Precision Orbit
Technical Characteristics	
Accuracy	Orbit error about 1cm
Spatial resolution	5 cm in altitude
Swath width	FOV :130 degrees
Waveband	401.25MHz, 2036.25MHz
Earth Topics	Natural Disasters (Landslide), Solid Earth (Tectonics/Seismic Activity)
Related Instruments	SAR, ARGOS, Sounder, DORIS-NG (JASON), DORIS-NG (CRYOSAT),GOLPE, GPS (ESA), INES, LRA (JASON), LRA (TOPEX), TRSR

Table 10: DORIS Instrument summary

2.3. Product file-type List

The following sections list all the product-types and auxiliary-types which are in scope of the SAFE Specialisation for ENVISAT.

2.3.1. Level 0

2.3.1.1. ASAR Product Types

Acronym	Description
ASA_APC_0P	Alternating Polarization (Copolar)
ASA_APH_0P	Alternating Polarization (Cross polar H)
ASA_APV_0P	Alternating Polarization (Cross polar V)
ASA_EC__0P	External Characterization
ASA_GM__0P	Global Monitoring Mode
ASA_IM__0P	Image Mode
ASA_MS__0P	Module Stepping Mode
ASA_WS__0P	Wide Swath Mode
ASA_WV__0P	Wave Mode

Table 11: ASAR L0 product-type list

2.3.1.2. MERIS Product Types

Acronym	Description
MER_CA__0P	Calibration
MER_FR__0P	Full Resolution
MER_RR__0P	Reduced Resolution
MER_RV__0P	Reduced Field of View

Table 12: MERIS L0 product-type list

2.3.1.3. AATSR Product Types

Acronym	Description
ATS_NL__0P	Nominal

Table 13: AATSR L0 product-type list

2.3.1.4. RA-2 Product Types

Acronym	Description
RA2_CAL_0P	IF Calibration and BITE Mode
RA2_ME__0P	Measurement Mode

Table 14: RA-2 L0 product-type list

2.3.1.5. MWR Product Types

Acronym	Description
MWR_NL_0P	Nominal

Table 15: MWR L0 product-type list

2.3.1.6. GOMOS Product Types

Acronym	Description
GOM_NL__0P	Nominal
GOM_MM__0P	Monitoring

Table 16: GOMOS L0 product-type list

2.3.1.7. MIPAS Product Types

Acronym	Description
MIP_LS__0P	Line of Sight (LOS)
MIP_NL__0P	Nominal
MIP_RW__0P	Raw Data and SPE Self Test Mode

Table 17: MIPAS L0 product-type list

2.3.1.8. SCIAMACHY Product Types

Acronym	Description
SCI_NL__0P	Nominal

Table 18: SCIAMACHY L0 product-type list

2.3.1.9. DORIS Product Types

Acronym	Description
DOR_DOP_0P	Doppler
DOR_NAV_0P	Satellite -Navigator

Table 19: DORIS L0 product-type list

2.4. Processing chain description

2.4.1. ASAR

This section provides a conceptual workflow description for the Envisat ASAR processing chain, giving general information about the process and the inputs/outputs that are needed/generated in each step.

The general, high level processing chain showing the inputs and all possible outputs is shown in Figure 1.

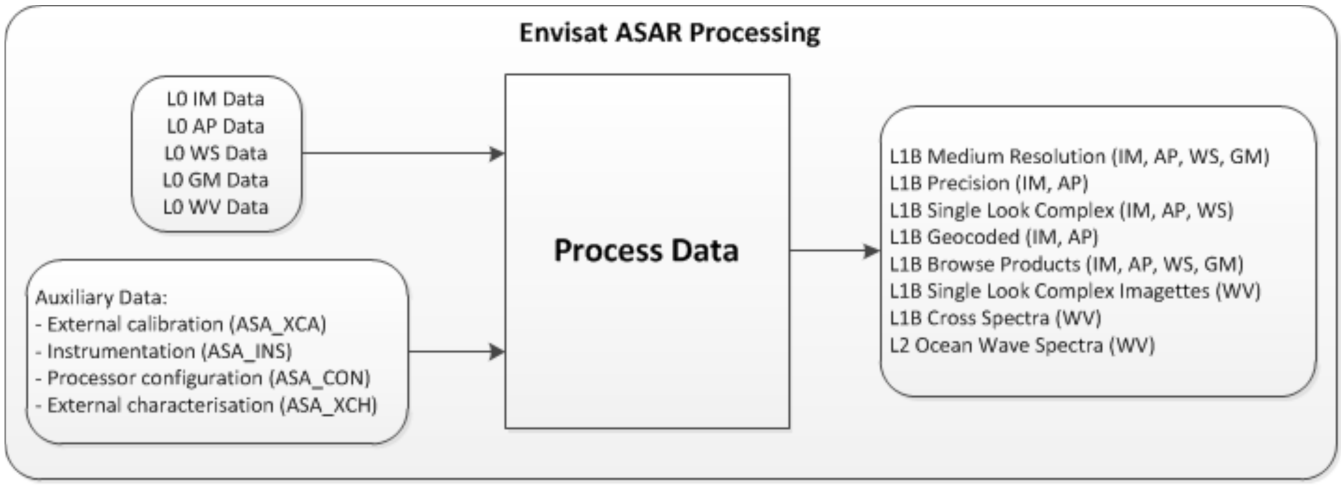

Figure 1: Generic high level processing chain showing inputs and possible outputs of the processing chain.

Summary information about the Envisat ASAR processor is shown in Table 20.

Instrument:	Envisat ASAR
Output Processing Level:	L1B, L2
Known/reference implementations	
Developer:	MacDonald Dettwiler and Associates (MDA)
Documentation reference:	ASAR Instrument Processing Facility (IPF) Interface Control Document (ICD), CAE-IC-52-4826, latest issue.
Possibility to reuse the processor:	Yes (ESA)
Possibility to modify the processor:	No (binary)

Table 20: Summary information about Envisat ASAR processor.

2.4.1.1. Imaging Mode ASAR Processing Chain

The processing chain for ASAR imaging modes showing the required inputs and possible outputs is shown in Figure 2.

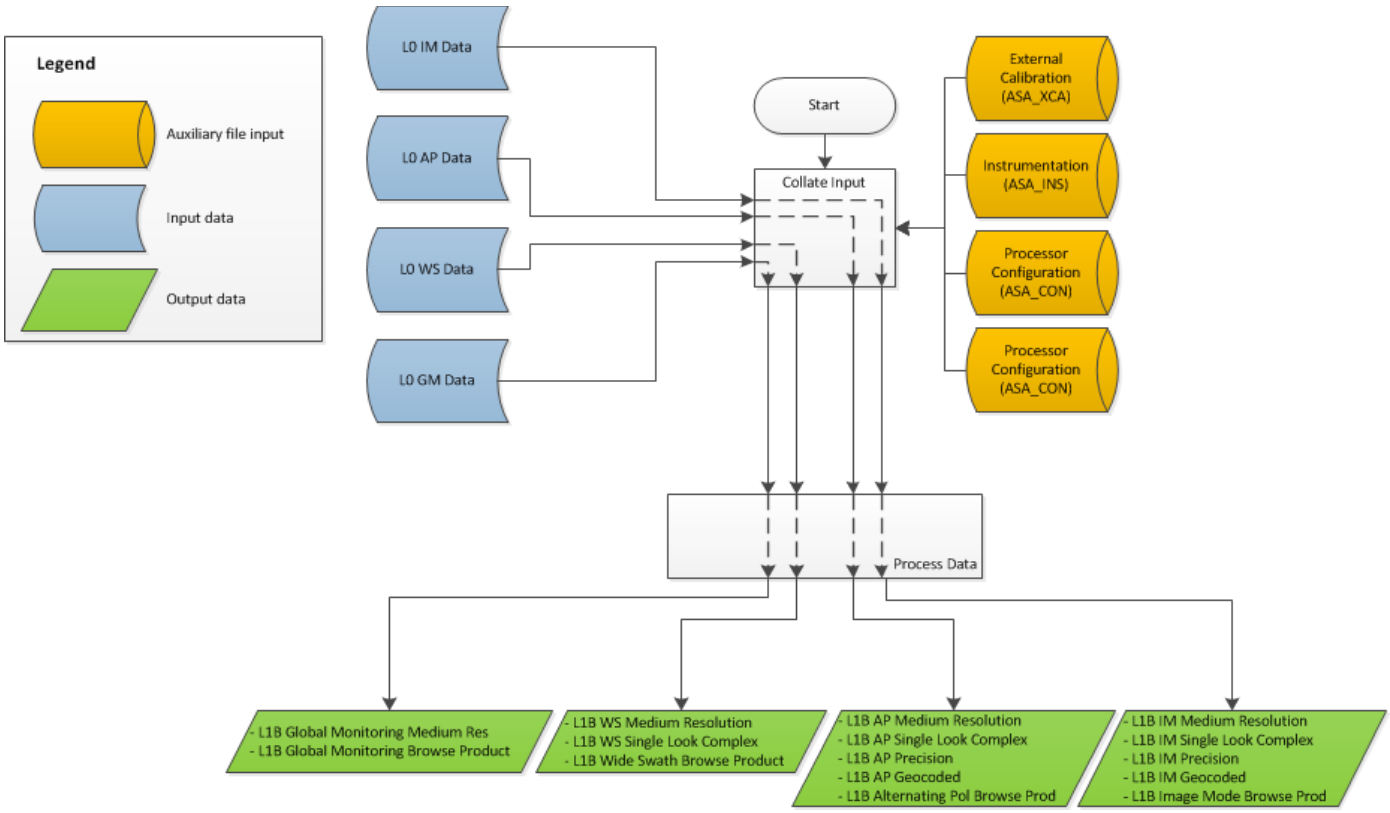

Figure 2: ASAR imaging mode processing chain showing inputs and possible outputs.

The ASAR instrument operated in the following High Rate Imaging modes:

- Image Mode (IM)
- Alternative Polarisation mode (AP)
- Wide Swath mode (WS)

And in the following Low Rate Imaging mode:

- Global Monitoring mode (GM)

The inputs required and the possible ASAR outputs generated in processing are listed below. The processor will use L0 ASAR input and produces outputs as follows:

- L1B Single Look Complex (SLC)
- L1B Precision Image (PRI)
- L1B Geocoded (GEC)
- L1B Medium Resolution (MR)
- L1B Browse Products (BP)

The mandatory input auxiliary files are:

- External Calibration (ASA_XCA)
- Instrumentation (ASA_INS)
- Processor Configuration (ASA_CON)
- External Characterisation (ASA_XCH)

Input	Processor	Output	Destination (next Processor)
Product-types:	ASAR IPF	**Product-types:**	N/A
L0 IM Data (ASA_IM__0P)		L1B IM SLC (ASA_IMS_1P) L1B IM PRI (ASA_IMS_1P) L1B IM GEC (ASA_IMG_1P) L1B IM MR (ASA_IMM_1P) L1B IM BP (ASA_IM__BP)	
Auxiliary-types:		**Auxiliary-types:**	
• ASA_XCA • ASA_INS • ASA_CON • ASA_XCH		N/A	

Table 21: ASAR Image Mode (IM) Inputs/Outputs.

Input	Processor	Output	Destination (next Processor)
Product-types:	ASAR IPF	**Product-types:**	N/A
L0 AP Data (ASA_AP__0P)		L1B AP SLC (ASA_APS_1P) L1B AP PRI (ASA_APP_1P) L1B AP GEC (ASA_APG_1P) L1B AP MR (ASA_APM_1P) L1B AP BP (ASA_AP__BP)	
Auxiliary-types:		**Auxiliary-types:**	
• ASA_XCA • ASA_INS • ASA_CON • ASA_XCH		N/A	

Table 22: ASAR Alternating Polarisation (AP) mode Inputs/Outputs

Input	Processor	Output	Destination (next Processor)
Product-types:	ASAR IPF	**Product-types:**	N/A
L0 WS Data (ASA_WS__0P)		L1B WS SLC (ASA_WSS_1P) L1B WS MR (ASA_WSM_1P) L1B WS BP (ASA_WS__BP)	
Auxiliary-types:		**Auxiliary-types:**	
• ASA_XCA • ASA_INS • ASA_CON • ASA_XCH		N/A	

Table 23: ASAR Wide Swath (WS) mode Inputs/Outputs

Input	Processor	Output	Destination (next Processor)
Product-types:	ASAR IPF	**Product-types:**	N/A
L0 GM Data (ASA_GM__0P)		L1B GM MR (ASA_GM1_1P) L1B GM BP (ASA_GM__BP)	
Auxiliary-types:		**Auxiliary-types:**	
• ASA_XCA • ASA_INS • ASA_CON • ASA_XCH		N/A	

Table 24: ASAR Global Monitoring (GM) mode Inputs/Outputs

2.4.1.2. Wave Mode ASAR Processing Chain

The processing chain for ASAR wave mode showing the required inputs and possible outputs is shown in Figure 3.

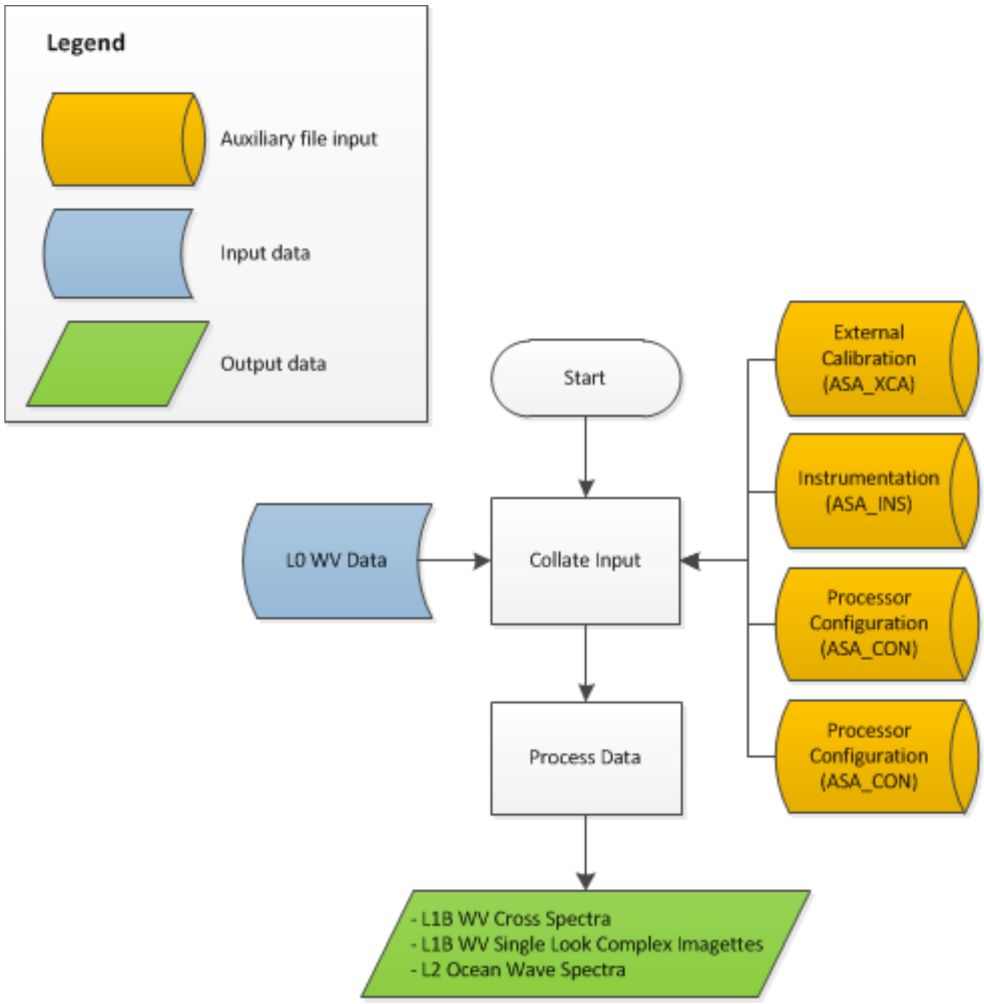

Figure 3: ASAR wave (WV) mode processing chain showing inputs and possible outputs

The inputs required and the possible ASAR outputs generated in processing are listed below. The processor will use L0 ASAR input and produces outputs as follows:

- L1B WV Cross Spectra (WVS)
- L1B WV Single Look Complex Imagettes (WVI)
- L2 Ocean Wave Spectra (WVW)

The mandatory input auxiliary files are:

- External Calibration (ASA_XCA)
- Instrumentation (ASA_INS)
- Processor Configuration (ASA_CON)
- External Characterisation (ASA_XCH)

Input	**Processor**	**Output**	**Destination (next Processor)**
Product-types:	ASAR IPF	**Product-types:**	N/A
L0 WV Data (ASA_WV__0P)		L1B WVI (ASA_WVI_1P) L1B WVS (ASA_WVS_1P) L2 WVW (ASA_WVW_2P)	
Auxiliary-types:		**Auxiliary-types:**	
• ASA_XCA • ASA_INS • ASA_CON • ASA_XCH		N/A	

Table 25: ASAR Wave (WV) mode Inputs/Outputs

3.Metadata Specialisation

All metadata types that are defined from scratch or modified by the present specialisation have been included in this section. Several of the non-modified metadata types, such as those from XFDU or from OGC EOP O&M, are not repeated in the present book as they are considered implicitly inherited and therefore, unchanged (the reader is simply referred to the corresponding schemas). However, for some of the OGC EOP O&M metadata types, additional clarifications or restrictions applicable to the SAFE specialisation for ENVISAT are provided.

This section details:

1) the specific metadata elements that are considered applicable from the [OGC EOP O&M] metadata model for the SAFE EO products.
2) the specific metadata elements that are considered applicable from the SAFE scene set metadata model (safe-ssm.xsd) for the EO Scene Product (that can be obtained from the data striplines measured by the instrument).

As part of this specialisation, the following sections describe the extensions that are needed to be included in the metadata models to allocate a particular metadata not foreseen by the model, and/or to restrict the metadata model to accommodate some of the values that are required by the ENVISAT products/auxiliary files.

3) the specific metadata elements that are considered applicable from the SAFE auxiliary metadata model (safe-aux.xsd) for the Auxiliary files.

The metadata specialisation has been classified by different abstraction levels (column “Abstraction”):

- Mission level (M): These metadata are common to all products generated for the mission.
- Instrument level (I): These metadata are common to all products generated for a specific instrument.
- Processing level (P): These metadata are common to all products generated for a specific product level. In this case, the specialisation is specified in a separate control book (i.e. [ENVISAT-BOOK-L0] for L0 products).

3.1. EO Products

The following table represents the metadata specialisation with respect to the OGC EOP O&M metadata model applicable to all products of the ENVISAT mission (applicable version of the OGC EOP O&M metadata model is referenced in [OGC EOP O&M]).

Where:

- ***XML element or attribute***: Element or attribute from the EOP O&M metadata model (leaf node is in black).
- ***Cardinality:*** Cardinality of the element/attribute tailored for the mission.
- ***Description:*** Brief description of the element/attribute.
- ***Format/Allowed Values:*** Expected format and possible values identified for the mission.

3.1.1. Metadata specialisation at Mission level

The following table describes all the metadata elements that must be present in the metadata file of a SAFE EO Product package generated for ENVISAT:

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:phenomenonTime/* *gml:TimePeriod/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:phenomenonTime/* *gml:TimePeriod/* **gml:beginPosition**	1	Acquisition end date time in ISO 8601 formatFor the last scene in the scene set metadata it corresponds to the stripline endPosition time minus 1 second	Format: CCYY-MM-DDThh:mm:ss.cccZ Range: from 1991-07-25T20:52:34.000 to 2012-04-08T11:05:47.999Z
sar:EarthObservation/ *om:phenomenonTime/* *gml:TimePeriod/* **gml:endPosition**	1	Acquisition end date time in ISO 8601 formatFor the last scene in the scene set metadata it corresponds to the stripline endPosition time minus 1 second	Format: CCYY-MM-DDThh:mm:ss.cccZ Range: from 1991-07-25T20:52:34.000Z to 2012-04-08T11:05:47.999Z
sar:EarthObservation/ *om:resultTime/* *gml:TimeInstant/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ *om:resultTime/* *gml:TimeInstant/* **gml:timePosition**	1	The time when result becomes available in ISO 8601 format.	Format: CCYY-MM-DDThh:mm:ss.cccZ same value as om:phenomenonTime/gml:TimePeriod/gml:endPosition
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:platform/* *eop:Platform/* **eop:shortName**	1	Platform short name.	Format: String Value: Envisat
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:instrument/* *eop:Instrument/* **eop:shortName**	1	Instrument (Sensor) name	Format: String Possible values: • **ASAR** • **MERIS** • **AATSR** • **RA-2** • **MWR** • **GOMOS** • **MIPAS** • **SCIAMACHY** • **DORIS**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* **eop:sensorType**	1	Sensor type.	Format: String Possible values: • **RADAR** • **IMAGE**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* **eop:operationalMode**	1	Sensor mode. Possible values are mission specific and should be retrieved using codeSpace.	Format: String Possible values (for ASAR): • IM • AP • WS • GM
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/*	1	Image resolution	Format: Integer Possible values (for ASAR):

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:Sensor/ **eop:resolution**			• 25 • 30 • 150 • 1000
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* *eop:resolution/* **@uom**	1	Resolution unit of measure	Format: String Value: **m**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* **eop:swathIdentifier**	1	Swath identifier. Value list can be retrieved with codeSpace.	Format: String Possible values (ASAR): • From IS1 to IS7 • WS0
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* *eop:swathIdentifier/* **@codeSpace**	1	Code space of the Swath Identifier	Format: String Possible values: • **urn:esa:eop:ASAR:swathIdentifier** • **urn:esa:eop:MERIS:swathIdentifier** • **urn:esa:eop:AATSR:swathIdentifier** • **urn:esa:eop:RA-2:swathIdentifier** • **urn:esa:eop:MWR:swathIdentifier** • **urn:esa:eop:GOMOS:swathIdentifier** • **urn:esa:eop:MIPAS:swathIdentifier** • **urn:esa:eop:SCIAMACHY:swathIdentifier** • **urn:esa:eop:DORIS:swathIdentifier**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:orbitNumber**	1	Acquisition orbit number	Format: Integer Possible values (ASAR): • From 149 to 84719 • From 921 to 52867 (only for ASA_GM__0P)
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:orbitDirection**	1	Acquisition orbit direction	Format: String Possible values: • ASCENDING • DESCENDING
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/*	1	Track number	Format: Integer

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:acquisitionParameters/ sar:Acquisition/ **eop:wrsLongitudeGrid**			Possible values (ASAR): • From 1 to 2411 • From 1 to 501 (only for ASA_GM__0P)
sar:EarthObservation/ om:procedure/ eop:EarthObservationEquipment/ eop:acquisitionParameters/ sar:Acquisition/ eop:wrsLongitudeGrid/ **@codeSpace**	1	Code space of the WRS	Format: String Value: **urn:esa:eop:ENVISAT:relativeOrbits**
sar:EarthObservation/ om:procedure/ eop:EarthObservationEquipment/ eop:acquisitionParameters/ sar:Acquisition/ **eop:startTimeFromAscendingNode**	1	Start time of acquisition in milliseconds from Ascending node date.	Format: Long Integer Possible values (ASAR): • From 0 to 6059000 • From 0 to 6035000 (only for ASA_GM__0P)
sar:EarthObservation/ om:procedure/ eop:EarthObservationEquipment/ eop:acquisitionParameters/ sar:Acquisition/ eop:startTimeFromAscendingNode/ **@uom**	1	unit of measure	Format: String Value: **ms**
sar:EarthObservation/ om:procedure/ eop:EarthObservationEquipment/ eop:acquisitionParameters/ sar:Acquisition/ **eop:completionTimeFromAscendingNode**	1	Completion time of acquisition in milliseconds from Ascending node date.	Format: Long Integer Possible values (ASAR): • From 0 to 6059000 • From 0 to 6035000 (only for ASA_GM__0P)
sar:EarthObservation/ om:procedure/ eop:EarthObservationEquipment/ eop:acquisitionParameters/ sar:Acquisition/ eop:completionTimeFromAscendingNode/ **@uom**	1	unit of measure	Format: String Value: **ms**
sar:EarthObservation/ **om:observedProperty**	1	xlink to the observed property definition	This field is mandatory but not used and has to be set to null as reported below. <om:observedProperty xsi:nil="true" nilReason="inapplicable"/>
sar:EarthObservation/ om:featureOfInterest/ eop:Footprint/ **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:multiExtentOf/* *gml:multiSurface/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:multiExtentOf/* *gml:multiSurface/* *gml:surfaceMember/* *gml:Polygon/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:multiExtentOf/* *gml:multiSurface/* *gml:surfaceMember/* *gml:Polygon/* *gml:exterior/* *gml:LinearRing/* **gml:posList**	1	Acquisition footprint coordinates, described by a closed polygon (last point=first point), using CRS:WGS84, Latitude,Longitude pairs (per-WGS84 definition of point ordering, not necessarily per all WFS implementations).	The footprint is made by the following points (seen from flight direction): - first right - right side standard scene corners - last right - last left - left side standard scene corners - first left - first right (repeated to close the polygon) The Polygon geometry shall be encoded in the EPSG:4326 geographic coordinate reference system and the coordinate pairs shall be ordered as lat /lon. Polygons enclose areas with points listed in CCW direction.
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:centerOf/* *gml:Point/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:centerOf/* *gml:Point/* **gml:pos**	1	Acquisition center coordinates.	The center position is the central coordinate of the acquisition line at the center time of the stripline The coordinate pair shall be ordered as lat /lon.
sar:EarthObservation/ *om:result/* *eop:EarthObservationResult/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:result/*	1	URN Reference to the EO product package.	Format: String

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:EarthObservationResult/ *eop:product/* *eop:ProductInformation/* *eop:fileName/* *ows:ServiceReference/* **@xlink:href**			
sar:EarthObservation/ *om:result/* *eop:EarthObservationResult/* *eop:product/* *eop:ProductInformation/* *eop:fileName/* *ows:ServiceReference/* **ows:RequestMessage**	1	OWS request message.	This element is not applicable and it shall be left blank
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:identifier**	1	Identifier for metadata item, includes ground segment namespace to guarantee uniqueness within EOP.	Format: String Product name without extension
eop:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* eop:parentIdentifier	0,1	Product Facility Dataset / collection Identifier (e.g. for CDS: the DataSet identifier or Sub DataSet Identifier). If the product is associated to various identifiers, the other identifiers have to be provided through Metadata Update Reports	Format: String Id of the collection identified
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:acquisitionType**	1	Used to distinguish at a high level the appropriateness of the acquisition for "general" use.	Format: String Value: **NOMINAL**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:productType**	1	Describes product type in case that mixed types are available within a single collection, this is ground segment specific definition.	Format: String Possible values (ASAR): • ASA_IM__0P • ASA_APC_0P • ASA_APH_0P • ASA_APV_0P • ASA_WS__0P • ASA_GM__0P
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:status**	1	Refers to product status.	Format: String Value: **ARCHIVED**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:downlinkedTo/* *eop:DownlinkInformation/*	1	Acquisition Station of downlinked satellite data	Format: String See Appendix C.

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:acquisitionStation			
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:downlinkedTo/ eop:DownlinkInformation/ eop:acquisitionStation/ **@codeSpace**	1	Acquisition Station codespace	Format: String Value: **urn:esa:eop:facility**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ **eop:productQualityDegradation**	0,1	Quality degradation percentage.	gml:MeasureType ENVISAT M: Expresses the percentage of missing lines with respect to the total number of lines in the stripline ENVISAT S: N/A
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:productQualityDegradation/ **@uom**	0,1	Unit of Measure. It is mandatory if productQualityDegradation is available	Format: String Value: **%**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:productQualityDegradationQuotationMode	0,1	Indicator to know how the quality degradation percentage has been calculated. It is mandatory if productQualityDegradation is available	Format: String Value: **AUTOMATIC**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ **eop:productQualityStatus**	0,1	Quality status, e.g. after the product passed a quality check.	Format: String Value: • DEGRADED • NOMINAL Limitations: ENVISAT S: N/A
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ **eop:productQualityDegradationTag**	0,1	Keywords giving information on the degradations affecting the product, provided eop:productQualityStatus value is DEGRADED.	Format: String A numeric code from 0 to 255 preceded with "_" . Example: _110 For values above 100 eop:productQualityStatus is DEGRADED Limitations: ENVISAT S: N/A
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/	0,1	codespace. Mandatory if	Format: String Possible values:

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:productQualityDegradationTag/ **@codeSpace**		productQualityDegradationTag is available	• **urn:esa:eop:ENVISAT:ASAR:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:MERIS:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:AATSR:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:RA-2:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:MWR:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:GOMOS:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:MIPAS:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:SCIAMACHY:Image:QualityDegradationTag** • **urn:esa:eop:ENVISAT:DORIS:Image:QualityDegradationTag**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:processing/* *eop:ProcessingInformation/* **eop:processingCenter**	1	Processing centre code.	Format: String See Appendix C.
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:processing/* *eop:ProcessingInformation/* *eop:processingCenter/* **@codeSpace**	1	Acquisition Station codespace	Format: String Value: **urn:esa:eop:ENVISAT:facility**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:processing/* *eop:ProcessingInformation/* **eop:processingDate**	1	Processing date time	Format: CCYY-MM-DDThh:mm:ss.cccZ
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:processing/* *eop:ProcessingInformation/* **eop:processorVersion**	1	Processor software version (e.g. 1.0)	Format: String
opt:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetadata/* *eop:processing/* *eop:ProcessingInformation/* **eop:processingLevel**	1	Processing level applied to the product.	Format: String Value: **other: L0**
opt:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetadata/* *eop:processing/* *eop:ProcessingInformation/*	1	Native product format.	Format: String

XML element or attribute	Cardinality	Description	Format/Allowed values
`eop:nativeProductFormat`			

Table 26: EOP O&M Metadata tailoring for ENVISAT L0 EO Products

3.1.2. Metadata specialisation at Instrument level

The following sections describe the metadata elements that must be present in a metadata file of a SAFE EO Product package depending on the Instrument.

3.1.2.1. ASAR

The following table specifies the metadata elements that must be present in a metadata file of a SAFE EO Product package obtained from the data measured by the ASAR instrument:

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **sar:polarisationMode**	1	Polarisation Mode	Format: String Possible values: • S • D
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **sar:polarisationChannels**	1	Polarisation Channels	Format: String Possible values: • HH • VV • HH, VV • HH, HV • VV, VH
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localAttribute(gaps)**	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **gaps**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localValue(gaps)**	0,1	See previous eop :localAttribute field. Number of gaps in the stripline or scene	Format: Integer ENVISAT M: Gaps in the stripline ENVISAT S: N/A
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localAttribute(lines)**	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **lines**
sar:EarthObservation/	0,1	See previous eop :localAttribute field.	Format: Integer

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:metaDataProperty/ *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localValue(lines)**		Number of lines in the stripline or scene	ENVISAT M: Lines in the stripline ENVISAT S: N/A
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localAttribute(qualityAssessmentWarning)**	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **qualityAssessmentWarning**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localValue(qualityAssessmentWarning)**	0,1	See previous eop :localAttribute field. qualityAssessmentWarning	Format: String Warning Message returned by quality assessment
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localAttribute(missionPhase)**	1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **missionPhase**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:vendorSpecific/* *eop:SpecificInformation/* **eop:localValue(missionPhase)**	1	See previous eop :localAttribute field. Mission phase	Format: Integer Possible values: • 1 • 2 • 3

Table 27: EOP O&M Metadata tailoring for ENVISAT-ASAR EO Products

3.2. *EO Scene Products*

SAFE EO Product Packages will always contain a single XML file applying to the whole product (based on the [OGC EOP O&M] model as described in previous section) and optionally, another XML file containing scene information that can be extracted from the data striplines measured the instrument.

The following table provides the tailoring of the XML elements to be used in this optional metadata file inside the EO Product Packages considering the scene set metadata model specified for SAFE (safe-ssm.xsd).

Where:

- ***XML element or attribute***: Element or attribute from the EOP O&M metadata model (leaf node is in black).
- ***Cardinality:*** Cardinality of the element/attribute tailored for the mission.
- ***Description:*** Brief description of the element/attribute.
- ***Format/Allowed Values:*** *Expected format and possible values identified for the mission.*

3.2.1. ASAR

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:phenomenonTime/* *gml:TimePeriod/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:phenomenonTime/* *gml:TimePeriod/* **gml:beginPosition**	1	Acquisition end date time in ISO 8601 formatFor the last scene in the scene set metadata it corresponds to the stripline endPosition time minus 1 second	Format: CCYY-MM-DDThh:mm:ss.cccZ Range: from 1991-07-25T20:52:34.000 to 2012-04-08T11:05:47.999Z
sar:EarthObservation/ *om:phenomenonTime/* *gml:TimePeriod/* **gml:endPosition**	1	Acquisition end date time in ISO 8601 formatFor the last scene in the scene set metadata it corresponds to the stripline endPosition time minus 1 second	Format: CCYY-MM-DDThh:mm:ss.cccZ Range: from 1991-07-25T20:52:34.000Z to 2012-04-08T11:05:47.999Z
sar:EarthObservation/ *om:resultTime/* *gml:TimeInstant/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:resultTime/* *gml:TimeInstant/* **gml:timePosition**	1	The time when result becomes available in ISO 8601 format.	Format: String same value as om:phenomenonTime/gml:TimePeriod/gml:endPosition
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:platform/* *eop:Platform/* **eop:shortName**	1	Platform short name.	Format: String Value: **Envisat**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:instrument/* *eop:Instrument/* **eop:shortName**	1	Instrument (Sensor) name	Format: String Value: **ASAR**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* **eop:sensorType**	1	Sensor type.	Format: String Value: **RADAR**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* **eop:operationalMode**	1	Sensor mode. Possible values are mission specific and should be retrieved using codeSpace.	Format: String Possible values: • Image • IM • AP • WS
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* **eop:resolution**	1	Image resolution	Format: String Possible values: • 25 • 30 • 150
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* *eop:resolution/* **@uom**	1	Resolution unit of measure	Format: String Value: **m**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* **eop:swathIdentifier**	1	Swath identifier. Value list can be retrieved with codeSpace.	Format: String Possible values: • From IS1 to IS7 • WS0

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:sensor/* *eop:Sensor/* *eop:swathIdentifier/* **@codeSpace**	1	Code space of the Swath Identifier	Format: String Value: **urn:esa:eop:ASAR:swathIdentifier**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:orbitNumber**	1	Acquisition orbit number	Format: Integer From 149 to 84719
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:orbitDirection**	1	Acquisition orbit direction	Format: String Possible values: • ASCENDING • DESCENDING
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:wrsLongitudeGrid**	1	Track number	Format: Integer From 1 to 2411
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* *eop:wrsLongitudeGrid/* **@codeSpace**	1	Code space of the WRS	Format: String Value: **urn:esa:eop:ENVISAT:relativeOrbits**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:wrsLatitudeGrid**	1	Frame number	Format: Integer From 9 to 7191 Steps of 18
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* *eop:wrsLongitudeGrid/* **@codeSpace**	1	Code space of the WRS	Format: String Possible values: • urn:esa:eop:ENVISAT:ASAR:IM:frames • urn:esa:eop:ENVISAT:ASAR:AP:frames • urn:esa:eop:ENVISAT:ASAR:WS:frames
sar:EarthObservation/	1	Start time of acquisition in milliseconds from Ascending node date.	Format: Long Integer

XML element or attribute	Cardinality	Description	Format/Allowed values
om:procedure/ *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:startTimeFromAscendingNode**			From 0 to 6059000
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* *eop:startTimeFromAscendingNode/* **@uom**	1	unit of measure	Format: String Value: **ms**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **eop:completionTimeFromAscendingNode**	1	Completion time of acquisition in milliseconds from Ascending node date.	Format: Long Integer From 0 to 6059000
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* *eop:completionTimeFromAscendingNode/* **@uom**	1	unit of measure	Format: String Value: **ms**
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **sar:polarisationMode**	1	Polarisation Mode	Format: String Possible values: • S • D
sar:EarthObservation/ *om:procedure/* *eop:EarthObservationEquipment/* *eop:acquisitionParameters/* *sar:Acquisition/* **sar:**polarisationChannels	1	Polarisation Channels	Format: String Possible values: • HH • VV • HH, VV • HH, HV • VV, VH
sar:EarthObservation/ **om:observedProperty**	1	xlink to the observed property definition	This field is mandatory but not used and has to be set to null as reported below. <om:observedProperty xsi:nil="true" nilReason="inapplicable"/>

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:multiExtentOf/* *gml:multiSurface/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:multiExtentOf/* *gml:multiSurface/* *gml:surfaceMember/* *gml:Polygon/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:multiExtentOf/* *gml:multiSurface/* *gml:surfaceMember/* *gml:Polygon/* *gml:exterior/* *gml:LinearRing/* **gml:posList**	1	Acquisition footprint coordinates, described by a closed polygon (last point=first point), using CRS:WGS84, Latitude,Longitude pairs (per-WGS84 definition of point ordering, not necessarily per all WFS implementations).	The footprint is made of the 4 standard scene corner coordinates of the scene starting with the first-right in flight drection and proceeding counterclock-wise. Per convention, the first point has to be added also as fifth point to close the polygon The Polygon geometry shall be encoded in the EPSG:4326 geographic coordinate reference system and the coordinate pairs shall be ordered as lat /lon. Polygons enclose areas with points listed in CCW direction.
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:centerOf/* *gml:Point/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file
sar:EarthObservation/ *om:featureOfInterest/* *eop:Footprint/* *eop:centerOf/* *gml:Point/* **gml:pos**	1	Acquisition center coordinates.	The center position is the central coordinate of the acquisition line at the center time of the scene The coordinate pair shall be ordered as lat /lon.
sar:EarthObservation/ *om:result/* *eop:EarthObservationResult/* **@gml:id**	1	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file.	Format: String The convention is to use eop:identifier + _N (as a suffix), where N is a counter starting from 1 and incremented with each gml:id attribute present in a given file

XML element or attribute	Cardinality	Description	Format/Allowed values
sar:EarthObservation/ *om:result/* *eop:EarthObservationResult/* *eop:product/* *eop:ProductInformation/* *eop:fileName/* *ows:ServiceReference/* **@xlink:href**	1	Product HTTP URI	Virtual product name according 2.3.1 using scene data, having counter set to "0000" and processing centre code "ESA" e.g. SAR_IM__0PTESA19951221_103430_00000015A078_00495_23028_0000.E1
sar:EarthObservation/ *om:result/* *eop:EarthObservationResult/* *eop:product/* *eop:ProductInformation/* *eop:fileName/* *ows:ServiceReference/* **ows:RequestMessage**	1	OWS request message.	This element is not applicable and it shall be left blank
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:identifier**	1	Identifier for metadata item, includes ground segment namespace to guarantee uniqueness within EOP.	Format: String Virtual product name without extension
eop:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* eop:parentIdentifier	0,1	Product Facility Dataset / collection Identifier (e.g. for CDS: the DataSet identifier or Sub DataSet Identifier). If the product is associated to various identifiers, the other identifiers have to be provided through Metadata Update Reports	Format: String
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:acquisitionType**	1	Used to distinguish at a high level the appropriateness of the acquisition for "general" use.	Format: String Value: **NOMINAL**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:productType**	1	Describes product type in case that mixed types are available within a single collection, this is ground segment specific definition.	Format: String Possible values: • ASA_IM__0P • ASA_APC_0P • ASA_APH_0P • ASA_APV_0P • ASA_WS__0P
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:status**	1	Refers to product status.	Format: String Value: **ARCHIVED**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:downlinkedTo/*	1	Acquisition Station of downlinked satellite data	Format: String See Appendix C.

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:DownlinkInformation/ eop:acquisitionStation			
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:downlinkedTo/* *eop:DownlinkInformation/* *eop:acquisitionStation/* **@codeSpace**	1	Acquisition Station codespace	Format: String Value: **urn:esa:eop:facility**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:productQualityDegradation**	0,1	Quality degradation percentage.	gml:MeasureType ENVISAT M: Expresses the percentage of missing lines with respect to the total number of lines in the stripline ENVISAT S: N/A
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* *eop:productQualityDegradation/* **@uom**	0,1	Unit of Measure. It is mandatory if productQualityDegradation is available	Format: String Value: **%**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* eop:productQualityDegradationQuotationMode	0,1	Indicator to know how the quality degradation percentage has been calculated. It is mandatory if productQualityDegradation is available	Format: String Value: **AUTOMATIC**
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:productQualityStatus**	0,1	Quality status, e.g. after the product passed a quality check.	Format: String Possible values: • DEGRADED • NOMINAL Limitations: ENVISAT S: N/A
sar:EarthObservation/ *eop:metaDataProperty/* *eop:EarthObservationMetaData/* **eop:productQualityDegradationTag**	0,1	Keywords giving information on the degradations affecting the product, provided eop:productQualityStatus value is DEGRADED.	Format: String A numeric code from 0 to 255 preceded with "_" . Example: _110 For values above 100 eop:productQualityStatus is DEGRADED Limitations: ENVISAT S: N/A
sar:EarthObservation/ *eop:metaDataProperty/*	0,1	codespace.	Format: String

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:EarthObservationMetaData/ eop:productQualityDegradationTag/ **@codeSpace**		Mandatory if productQualityDegradationTag is available	Value: **urn:esa:eop:ENVISAT:ASAR:Image:QualityDegradationTag**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localAttribute(baselinePerpendicularOffset)**	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **baselinePerpendicularOffset**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localValue(baselinePerpendicularOffset)**	0,1	See previous eop :localAttribute field. The baselinePerpendicular offset value is an integer expressing the vertical offset from the baseline reference orbit in meter	Format: Integer
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localAttribute(synchburst)**	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **synchburst**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localValue(synchburst)**	0,1	See previous eop :localAttribute field. The synchburst value is an integer representing the offset respect the reference acquisition at scene centre	Format: Integer Only for ASAR Wide Swath product types
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localAttribute(gaps)**	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **gaps**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localValue(gaps)**	0,1	See previous eop :localAttribute field. Number of gaps in the stripline or scene	Format: Integer ENVISAT M: Gaps in the stripline ENVISAT S: N/A
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **lines**

XML element or attribute	Cardinality	Description	Format/Allowed values
eop:localAttribute(lines)			
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localValue(lines)**	0,1	See previous eop :localAttribute field. Number of lines in the stripline or scene	Format: Integer ENVISAT M: Lines in the stripline ENVISAT S: N/A
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localAttribute(qualityAssessmentWarning)**	0,1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **qualityAssessmentWarning**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localValue(qualityAssessmentWarning)**	0,1	See previous eop :localAttribute field. qualityAssessmentWarning	Format: String Warning Message returned by quality assessment
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localAttribute(missionPhase)**	1	This pair of localAttribute/localValue elements can be used to provide, additional attributes in the product metadata without changing the model.	Format: String Value: **missionPhase**
sar:EarthObservation/ eop:metaDataProperty/ eop:EarthObservationMetaData/ eop:vendorSpecific/ eop:SpecificInformation/ **eop:localValue(missionPhase)**	1	See previous eop :localAttribute field. Mission phase	Format: Integer ENVISAT allowed values: • 1 • 2 • 3

Table 28: EOP O&M Metadata tailoring for ENVISAT-ASAR EO Secene Products

4. Naming Conventions

4.1. Level 0 Products

4.1.1. Package Names

Representation Information Metadata package
<*productType*>_RPI-MTD_<*cccc*>.SAFE
Representation Information Data package
<*productType*>_RPI-DAT_<*cccc*>.SAFE
Naming convention for Collection package
<*productType*>_COL-MTD_<*cccc*>.SAFE
Naming convention for product packages
<*productType*><*state*><*orig*>_<*start*>_<*d*><*p*><*c*>_<*rel*>_<*abs*>_<*nnnn*>_<*cccc*>.*SAFE*

Table 29: SAFE Package Names for ENVISAT L0 products

Where:

<*productType*> String identifying sensor, mode and processing level. (10 characters)
Characters not used are replaced with an underscore character (e.g. ASA_GM__0P)

<*state*> Product state flag (1 character)

- Set to “N” for Near Real Time product
- Set to “V” for fully validated (consolidated) product
- Set to “T” for Test product
- Set to “S” for a special product.

Letters between N and V are assigned in order of level of consolidation (i.e., closer to V = better consolidated)

<*orig*> Identification of the center which generated the file (3 characters)

- PDK = PDHS-K
- PDE = PDHS-E
- IEC=IECF
- LRA = LRAC
- PDC = PDCC
- FOS = FOS-ES
- PDA = PDAS-F
- PAM= Matera for NRT production
- UPA = UK-PAC
- DPA= D-PAC
- IPA = I-PAC
- FPA = F-PAC
- SPA = S-PAC
- EPA = E-PAC
- ECM = ECMWF
- ACR=ACRI
- FIN=FINPAC
- O_M=Orbite Mission

<*start*> Start date/time of the product from the UTC time of the first DSR (15 characters:

YYYYMMDD_hhmmss).

<*d*>	Time coverage of the product expressed in seconds. If the duration of a product is not relevant information it will be set to "00000000". (8 characters)
<*p*>	Mission phase identifier (1 character)
<*c*>	Cycle number within the mission phase (3 characters)
<*rel*>	Relative orbit number within the cycle at the beginning of the product (5 characters)
<*abs*>	Absolute orbit at the beginning of the product (5 characters)
<*nnnn*>	Numerical wrap-around counter for quick file identification. For a given product type the counter is incremented by 1 for each new product generated by the product originator. (4 characters)
<*cccc*>	Is the CRC-16 value calculated over the manifest file inside the SAFE Package (4 characters).

4.1.1.1. URN Specifications

Representation Information Metadata package
urn:x-safe:ENVISAT:<*productType*>_RPI-MTD
Representation Information Data package
urn:x-safe:ENVISAT:<*productType*>_RPI-DAT
Naming convention for collection package
urn:x-safe:ENVISAT:<*productType*>_COL-MTD
Naming convention for product packages
urn:x-safe:ENVISAT:<*productType*><*state*><*orig*>_<*start*>_<*d*><*p*><*c*>_<*rel*>_<*abs*>_<*nnnn*>

Table 30: URN Specification for ENVISAT L0 SAFE packages

Appendix A. Representation Information Packages

SAFE Representation Information Packages are characteristic of the specialisation and during the nominal operations of a SAFE archive such Packages will not normally be created. Therefore, the packages listed in the following sections can be used as-is to introduce ENVISAT support to a SAFE archive.

A.I. Rep. Info Packages for Level 0 products

The files listed below are distributed together with the set of documents that constitute the SAFE specialisation for ENVISAT L0. Each SAFE Package is compressed into a zip file which should be decompressed before usage.

These SAFE Packages may contain either the representation information of the target of preservation EO product (RPI-DAT) or the representation information of the metadata (RPI-MTD) for the product types.

[ENVISAT-BOOK-L0] provides a detailed description of those schemas (stored in the RPI-DAT packages) describing the data structure of the target of preservation.

A.I.I.ASAR

#	Filename
1	ASA_APC_0P_RPI-DAT_3809.SAFE.zip
2	ASA_APC_0P_RPI-MTD_1142.SAFE.zip
3	ASA_APH_0P_RPI-DAT_5749.SAFE.zip
4	ASA_APH_0P_RPI-MTD_1714.SAFE.zip
5	ASA_APV_0P_RPI-DAT_5616.SAFE.zip
6	ASA_APV_0P_RPI-MTD_3276.SAFE.zip
7	ASA_GM__0P_RPI-DAT_3233.SAFE.zip
8	ASA_GM__0P_RPI-MTD_1068.SAFE.zip
9	ASA_IM__0P_RPI-DAT_1200.SAFE.zip
10	ASA_IM__0P_RPI-MTD_4900.SAFE.zip
11	ASA_WS__0P_RPI-DAT_3907.SAFE.zip
12	ASA_WS__0P_RPI-MTD_2043.SAFE.zip
13	ASA_WV__0P_RPI-DAT_2496.SAFE.zip
14	ASA_WV__0P_RPI-MTD_5003.SAFE.zip

Appendix B. SAFE Package Examples

The packages listed in the following subsections are examples of SAFE ENVISAT EO Product distributed only for illustrative purposes together with the set of documents that constitute the SAFE specialisation for ENVISAT.

Each SAFE Package is compressed into a zip file which should be decompressed before usage.

B.I. SAFE Package examples for L0 (ASAR)

#	Filename
1	ASA_APC_0PNPAM20080311_085952_000000072066_00408_31524_0177_1784.SAFE.zip
2	ASA_APH_0CNPDE20071119_142536_000000162063_00297_29910_3465_5545.SAFE.zip
3	ASA_APV_0CNPDK20071119_211513_000000162063_00301_29914_0712_5634.SAFE.zip
4	ASA_GM__0PNPDK20021202_093646_000001062011_00394_03955_0269_5103.SAFE.zip
5	ASA_IM__0CNPDE20071119_031913_000000172063_00290_29903_1575_2913.SAFE.zip
6	ASA_WS__0PNPDK20040305_154359_000001252024_00455_10529_4738_2682.SAFE.zip
7	ASA_WV__0PNPDE20110724_223651_000000913105_00001_49153_9064_5002.SAFE.zip

Appendix C. Acquisition stations

In the following table the list of ENVISAT Acquisition stations are reported.

Station name	2-char station code	3-char station code
Fairbanks	AF	ASF
AliceS pring	AS	ASA
Atlanta Test Site	AT	ATL
Beijing	BJ	BJG
Bishkek	BK	BSK
Cordoba	CA	COA
Cachoeira Paulista	CP	CPA
Chetumal	CM	MEX
Cotopaxi	CO	CPE
Cuiaba	CU	CUB
Fucino	FS	FUI
Gatineau	GH	GAT
Grimstadt	GR	GRS
Hatoyama	HA	HAJ
Hyderabad – former Shadnadar	SE	HYD
Hobart	HO	HOA
Hawaii	HW	HW
Hyderabad	HY	HYD
PariPari	IN	DKI
TelAviv (IR)	IR	ISR
Johannesburg	JO	JOS
Kitab	KB	KTB
Khanty Mansisk	KM	KMY
Kiruna	KS	KIR
Kumamoto	KU	KUJ
Libreville	LI	LBG
Matera	MA	MTI
Miami	MI	MIM
Malindi	ML	MLD
McMurdo	MM	MMR

Station name	2-char station code	3-char station code
Maspalomas	MS	MPS
Moscow	MW	MSW
Norman	NO	NOM
Neustrelitz	NZ	NSG
O'Higgins	OH	OHG
PrinceAlbert	PH	PAS
Rhyad	SA	RSA
Singapore	SG	SGP
Syowa	SY	SYW
O'Higgins	TF	OHG
Bangkok	TH	BKT
Taipei (Taiwan)	TP	TPE
Tromsoe	TS	TRS
Istanbul	TU	IST
Chung-Li (Taiwan)	TW	TWN
Ulan Bator	UB	ULB
UNKNOWN	XX	XXX
West Freugh	WF	WFR