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## ENVISAT PAYLOAD DATA SEGMENT

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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</p> <p>ESA/0002: PF-Host time stamp clarified</p> <p>ESA/0004: Processing PCD added</p> <p>ESA/0006: AF PCD ADS and DSD added</p> <p>ESA/0007: page A-3 updated</p> <p>ESA/0008: page B-3 updated</p> <p>ESA/0009: Table 8.1.1 modified</p> <p>ESA/0011: TBD changed to Range/Doppler</p> <p>ESA/0013: FEP header defined</p> <p>ESA/0014: Table 8.4.7.4-2 corrected</p> <p>CSF/1: filename in MPH corrected</p> <p>CSF/2: page A-3 updated</p>	

ISSUE	REVISION	DATE	CHANGE STATUS	ORIGIN
1	C	04/04/96	<p>CSF/3: MPH PCD information updated</p> <p>CSF/5: DSD added to Level 0 SPH</p> <p>CSF/6: Section on AATSR updated and re-issued</p> <p>CSF/8: AATSR_O Summary Sheet updated</p> <p>SCR #38, CR #38 Issue 1, Revision C</p> <p>Reason for Change:</p> <p>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.</p>	Products Review Meeting #1
2	A	20/05/96	<p>SCR #71, CR #71 Issue 2</p> <p>Reason for Change:</p> <p>Separate volume created.</p> <p>Minor updates added.</p>	
3	A	19/06/97	<p>SCR #169, CR #169 Issue 3</p> <p>Reason for Change:</p> <p>Minor updates added.</p>	Products Review Meeting #3



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### REGISTER OF CHANGES

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## **2 OVERVIEW OF INSTRUMENTS**

### **2.1 ENVISAT SENSORS**

ENVISAT-1 will carry nine instruments, which are summarized in Table 2.1-1 below. More detailed information about the sensors and their products can be found in later sections. Included in Table 2.1-1 is information pertaining to the Housekeeping and Telemetry information transmitted from the ENVISAT satellite. Although not considered a core product, this information is important for monitoring satellite operations.

Table 2.1-1 ENVISAT-1 Sensors

Instrument	Characteristics	Description
AATSR	<p><b>Application:</b> Precise sea surface temperature, vegetation indices with improved visible atmospheric correction.</p> <p><b>Method:</b> Passive conical scanning, with 2 scans across satellite track regions: nadir and 46.9 degrees forward.</p>	The Advanced Along Track Scanning Radiometer (AATSR) measures radiation in infrared channels (3.7, 11.0, and 12.0 $\mu\text{m}$ ), and the near infrared and visible light channels (0.55, 0.67, 0.87, and 1.6 $\mu\text{m}$ ). Its primary mission is to measure sea surface temperature and land parameters such as vegetation indices. This instrument extends the mission of the ATSR instrument which has flown on ERS-1 and ERS-2.
ASAR	<p><b>Application:</b> Ocean waves, sea ice extent and motion, land surface (deforestation, desertification).</p> <p><b>Method:</b> Synthetic aperture radar, active phased-array antenna, with incidence angles between 15 and 45 degrees.</p>	The Advanced Synthetic Aperture Radar (ASAR) instrument provides radar images of the earth's surface (both land and sea) for a variety of applications. The ASAR instrument extends the mission of the AMI SAR instruments flown on ERS-1 and ERS-2, and provides continuity of data for SAR users across those missions.
DORIS	<p><b>Application:</b> Precise satellite positioning.</p> <p><b>Method:</b> Precise orbit determination via doppler shift measurements on radio-electric signals sent by terrestrial beacons.</p>	The Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS) instrument is a microwave Doppler tracking system which can be used to determine the satellite's exact position in space. It measures the Doppler frequency shifts of both VHF and S-band signals transmitted by ground beacons.

Table 2.1-1 ENVISAT-1 Sensors

Instrument	Characteristics	Description
GOMOS	<p><b>Application:</b> Monitoring and understanding of Ozone depletion in the stratosphere.</p> <p><b>Method:</b> Multi-spectral observation of star occultation at earth limb.</p>	<p>The Global Ozone Monitoring by Occultation of Stars (GOMOS) instrument measures tangential atmospheric ultraviolet, visual, and infrared light as a function of wavelength and altitude. Measurements are made by observation of stars through the atmosphere using a Cassegrain telescope and two spectrometers. The primary use of GOMOS data is for global monitoring of ozone in the stratosphere, but it can also be used to measure other gas concentrations such as NO<sub>2</sub>, NO<sub>3</sub> and H<sub>2</sub>O.</p>
MERIS	<p><b>Application:</b> Ocean colour monitoring (chlorophyll, yellow substance, suspended matter) and vegetation status.</p> <p><b>Method:</b> Multi-spectral imaging observation at nadir using 15 bands programmable in width and position.</p>	<p>The Medium Resolution Imaging Spectrometer (MERIS) instrument produces multi-band images representing radiance in the visible and near infra-red bands. MERIS measurements which can be derived from this data include:</p> <ul style="list-style-type: none"> <li>a) presence of cloud, water, and land;</li> <li>b) atmosphere parameters such as aerosol optical thickness, aerosol type, cloud albedo, optical thickness, cloud top pressure, water vapour column contents; and</li> <li>c) ocean parameters such as chlorophyll, gelbstoff, other pigments, and suspended solid matter.</li> </ul>
MIPAS	<p><b>Application:</b> Ozone chemistry, monitoring of global distribution of major greenhouse gases, atmospheric dynamics.</p> <p><b>Method:</b> Vertical scan at limb.</p>	<p>The Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) instrument measures atmospheric radiation in the range 4.15 um to 14.6 um. Its primary mission is to perform global observations of trace gases in the middle atmosphere, the tropopause region, and the upper troposphere.</p>

Table 2.1-1 ENVISAT-1 Sensors

Instrument	Characteristics	Description
MWR	<p><b>Application:</b> Total atmospheric water column measurement for correction of RA measurements.</p> <p><b>Method:</b> Passive radiometer.</p>	The Microwave Radiometer (MWR) instrument is a nadir-viewing two-channel, passive microwave radiometer operating at 23.8 and 36.5 GHz. It receives and measures microwave radiation generated and reflected by the Earth. The signals received provide an estimate of the total water content in the atmosphere.
RA-2	<p><b>Application:</b> Ocean topography, marine geoid characteristics, wind speed and wave height.</p> <p><b>Method:</b> Active sensor with 2 bands, Ku and S.</p>	The ENVISAT Radar Altimeter (RA-2) is a nadir-pointing, pulse limited radar altimeter used to provide high precision measurements of the distance from the satellite to the earth's surface. Its primary purpose is to measure sea level and land topography along satellite ground track. This instrument extends the mission of the RA instruments flown on ERS-1 and ERS-2.
SCIAMA-CHY	<p><b>Application:</b> Global distribution of trace gases, aerosols and clouds.</p> <p><b>Method:</b> Passive limb and nadir looking spectrometer.</p>	The Scanning Imaging Absorption Spectrometer for Atmospheric Cartography (SCIAMACHY) instrument provides spectra measured from light transmitted, back scattered or reflected by trace gases in the atmosphere. The instrument is designed for the global measurement of trace gases in the troposphere and stratosphere by means of two spectrometers scanning the atmosphere simultaneously at nadir and in limb. It records radiation in the range 0.24 um to 2.4 um.
HKTLM	Housekeeping Telemetry Data used to monitor ENVISAT functions	The ENVISAT Polar Platform generates auxiliary data from the service module, PMC, and instruments that is included in the data stream. The auxiliary data is placed in source packets and transferred to the On-board High Speed Multiplexer to be downlinked with the other low rate instrument data.

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