



Instrument Data Product Format

SeaWiFS LAC 1A

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Date : 19 February 1998

EO Formatting System
Instrument Data Product Format
SeaWiFS LAC 1A

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Distribution:

Summary:

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Change Log:

Changes, which have been performed since the document was issued as version 1.0/2 are listed here:

- 1.) Cosmetic changes: change of parameter names and presentation in order to ease readability.
- 2.) Equal length of all records in one data file to facilitate the writing of the data product on tape media.
- 3.) The Record_ID structure was simplified, renamed and is presented with it's record specific values in the detailed parameter description section 7.0.
- 4.) In the Volume Descriptor Record the Document Version/Revision number have been combined into one 4-character ASCII string, called Document_Version. The structures on product documentation and identification have been deleted and the single parameters formerly contained in those structures have been now listed in sequential order.
- 5.) The File Pointer Records have been simplified and padded at irrelevant parts with blanks.
- 6.) All CEOS specific values (e.g. CEOS_VDR_ID, CEOS_Flags, File_No_1, File_Name_2, etc.) are defined in section 7.0.
- 7.) Satellite Information Record: Nominal_Altitude changes to ASCII Character String (4 Bytes), Actual_Scan_Rate has been deleted, Scan_Rate changed to ASCII Character String (4 Bytes), Active_Sample_Rate changes to ASCII Character String (8 Bytes)
- 8.) The presentation of the tie_point_location parameters has been modified.
- 9.) Add one byte in the Image Data record to align the Image_Data field on an even byte.
- 10) Change of the names of the annotation attributes according to EOFS demonstrator guidelines.

Changes in Version 2.1 from 2.0

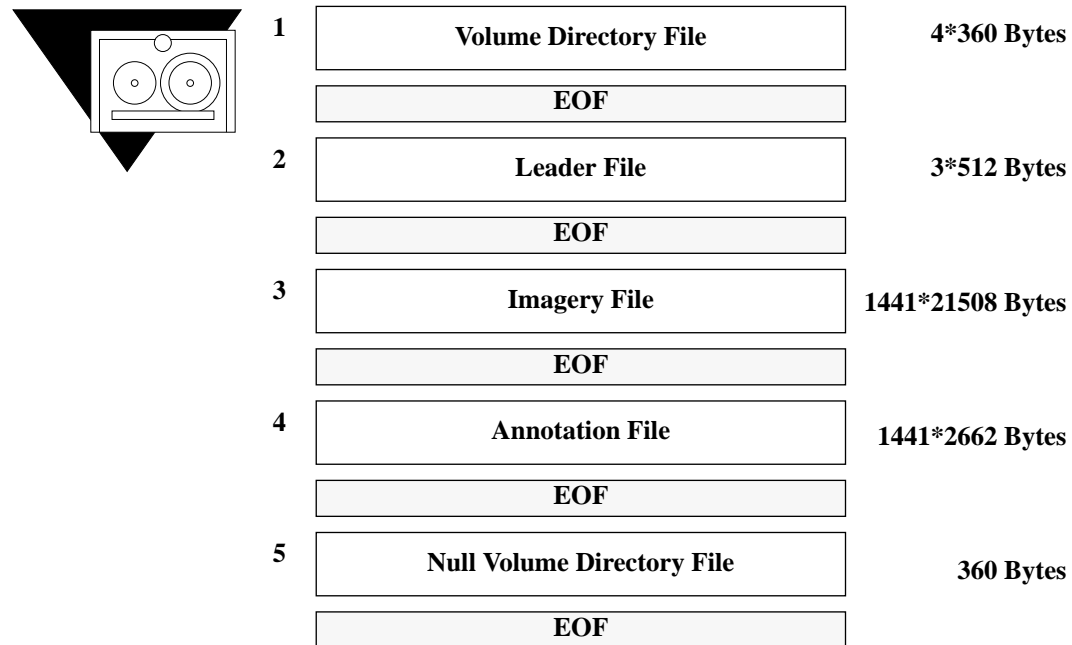
- 1) Finalisation of Leader File Format, removal of the calibration table, Leader Record length fixed to 512 bytes.

Changes in Version 2.2 from 2.1

- 1) Introduction of record length within each CEOS record identifier. This lead to modification of all CEOS record identifiers for all file pointer and file descriptor records.
- 2) Definition of Document_Version, Document_Name and Software_ID.

1.0 CEOS SeaWiFS Level 1A LAC Distribution Data Product Format

1.1 Product Organization on Sequential Media (Exabyte)

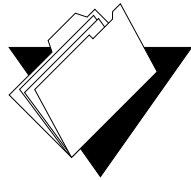


Each SeaWiFS LAC 1A data product consists of 5 data files:

- One Volume Directory File, which provides all product identification, documentation and processing information.
- One Leader File, which provides scene related information.
- One Imagery File, which contains the data obtained from the instrument
- One Annotation File, which provides navigation information and coastlines/boundaries/grid.
- One Null Volume Directory File, which is necessary on tape media to indicate the end of the data product.

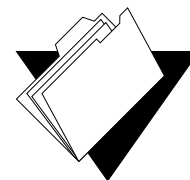
1.2 Files

Volume Directory File



1	Volume Descriptor Record	360 Bytes
2	Leader File Pointer Record	360 Bytes
3	Imagery File Pointer Record	360 Bytes
4	Annotation File Pointer Record	360 Bytes

Annotation File



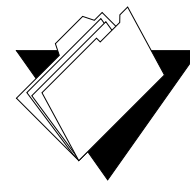
1	File Descriptor Record	2662 Bytes
2	Annotation Data Record 1	2662 Bytes
N+1	Annotation Data Record N	2662 Bytes

Leader File



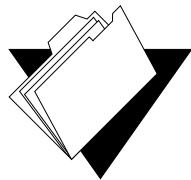
1	File Descriptor Record	512 Bytes
2	Scene Header Record	512 Bytes
3	Satellite Information Record	512 Bytes

Null Volume Directory File



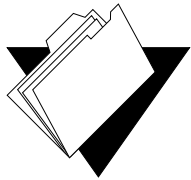
1	Null Volume Descriptor Record	360 Bytes
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Imagery File



1	File Descriptor Record	21508 Bytes
2	Image Data Record 1	21508 Bytes
N+1	Image Data Record N	21508 Bytes

2.0 Volume Directory File



1	Volume Descriptor Record	360 Bytes
2	Leader File Pointer Record	360 Bytes
3	Imagery File Pointer Record	360 Bytes
4	Annotation File Pointer Record	360 Bytes

2.1 Volume Descriptor Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_VDR_ID	CEOS Volume Descriptor Record Identification	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	Document_Name	Identification of the product description document	17	28	12	ASCII	12	1
4	Document_Version	Version of product description document	29	32	4	ASCII	4	1
5	Software_ID	Software Release Number	33	44	12	ASCII	12	1
6	Media_ID	Source Product Identifier	45	60	16	ASCII	16	1
7	Product_ID	Product Identifier	61	76	16	ASCII	16	1
8	Product_Type	Product Type Identifier	77	92	16	ASCII	16	1
9	BLANKS	CEOS reserved (20 Blanks)	93	112	20	ASCII	20	1
10	Processing_Time	Time of Product generation	113	120	16	ASCII	16	1
11	Processing_Country	Product Generating Country	129	140	12	ASCII	12	1
12	Processing_Facilty	Product Processing Facility	141	148	8	ASCII	8	1
13	Acquisition_Facilty	Product Acquisition Facility	149	160	12	ASCII	12	1
14	Product_Files	Number of Files belonging to the product	161	164	4	ASCII	4	1
15	VDF_Records	Number of Records in Volume Directory File	165	168	4	ASCII	4	1

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
16	BLANKS	Blanks	169	360	192	ASCII	1	1

2.2 Leader Pointer Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_FPR_ID_1	CEOS File Pointer Record Identification Parameters	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	File_No_1	File Sequence Number in Product	17	20	4	ASCII	4	1
4	File_Name_1	File Name	21	36	16	ASCII	16	1
5	BLANKS	Blanks	37	100	64	ASCII	1	64
6	Records_1	Number of Records in File	101	108	8	ASCII	8	1
7	FDR_Length_1	File Descriptor Record Length	109	116	8	ASCII	8	1
8	Max_Rec_Length_1	Maximum Record Length	117	124	8	ASCII	8	1
9	BLANKS	Blanks	125	360	236	ASCII	1	236

2.3 Imagery File Pointer Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_FPR_ID_2	CEOS File Pointer Record Identification Parameters	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	File_No_2	File Sequence Number in Product	17	20	4	ASCII	4	1
4	File_Name_2	File Name	21	36	16	ASCII	16	1
5	BLANKS	Blanks	37	100	64	ASCII	1	64
6	Records_2	Number of Records in File	101	108	8	ASCII	8	1
7	FDR_Length_2	File Descriptor Record Length	109	116	8	ASCII	8	1
8	Max_Rec_Length_2	Maximum Record Length	117	124	8	ASCII	8	1
9	BLANKS	Blanks	125	360	236	ASCII	1	236

2.4 Annotation File Pointer Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_FPR_ID_3	CEOS File Pointer Record Identification Parameters	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	File_No_3	File Sequence Number in Product	17	20	4	ASCII	4	1
4	File_Name_3	File Name	21	36	16	ASCII	16	1
5	BLANKS	Blanks	37	100	64	ASCII	1	64
6	Records_3	Number of Records in File	101	108	8	ASCII	8	1
7	FDR_Length_3	File Descriptor Record Length	109	116	8	ASCII	8	1
8	Max_Rec_Length_3	Maximum Record Length	117	124	8	ASCII	8	1
9	BLANKS	Blanks	125	360	236	ASCII	1	236

3.0 Leader File



1	File Descriptor Record	512 Bytes
2	Scene Header Record	512 Bytes
3	Satellite Information Record	512 Bytes

3.1 File Descriptor Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_FDR_ID_1	CEOS File Descriptor Record Identification	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	Document_Name	Identification of the product description document	17	28	12	ASCII	12	1
4	Document_Version	Version of product description document	29	32	4	ASCII	4	1
5	Software_ID	Software Release Number	33	44	12	ASCII	12	1
6	File_No_1	File Number	45	48	4	ASCII	4	1
7	File_Name_1	File Name	49	64	16	ASCII	16	1
8	BLANKS	CEOS reserved, filled with blanks (48 Blanks)	65	112	48	ASCII	1	48
9	CEOS_Flags	CEOS reserved Flags	113	116	4	ASCII	4	1
10	BLANKS	Blanks for padding to equal record length	117	512	396	ASCII	1	396

3.2 Scene Header Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Centre_Coordinates	Scene centre coordinates	1	32	32	Structure 3.2.1	32	1
2	Centre_Sun_Elev	Sun elevation angle at centre	33	48	16	ASCII (F16.8)	16	1
3	Centre_Line_No	Line number at scene centre	49	56	8	ASCII	8	1
4	Centre_Pixel_No	Pixel number at scene centre (Max. 1285 Pixels)	57	64	8	ASCII	8	1
5	Centre_Time	Scene centre date and time	65	96	32	ASCII	32	1
6	Scene_Start_Time	Data start date and time	97	128	32	ASCII	32	1
7	Scene_Stop_Time	Data stop date and time	129	160	32	ASCII	32	1
8	Scene_Coordinates	The 8 Scene Corner Coordinates	161	288	128	Structure 3.2.2	128	1
9	Actual_Scene_Lines	Number of actual scene lines in the processed image	289	296	8	ASCII	8	1
10	BLANKS	Blanks for padding to equal record length	297	512	216	ASCII	1	216

3.2.1 Centre_Coordinates Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Centre_Lat	Scene centre latitude	1	16	16	ASCII (F16.8)	16	1
2	Centre_Lon	Scene centre longitude	17	32	16	ASCII (F16.8)	16	1

3.2.2 Scene_Coordinates Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Upper_Left_Lat	Upper left corner latitude	161	176	16	ASCII (F16.8)	16	1
2	Upper_Left_Lon	Upper left corner longitude	177	192	16	ASCII (F16.8)	16	1
3	Upper_Right_Lat	Upper right corner latitude	193	208	16	ASCII (F16.8)	16	1
4	Upper_Right_Lon	Upper right corner longitude	209	224	16	ASCII (F16.8)	16	1
5	Lower_Left_Lat	Lower left corner latitude	225	240	16	ASCII (F16.8)	16	1
6	Lower_Left_Lon	Lower left corner longitude	241	256	16	ASCII (F16.8)	16	1
7	Lower_Right_Lat	Lower right corner latitude	257	272	16	ASCII (F16.8)	16	1
8	Lower_Right_Lon	Lower right corner longitude	273	288	16	ASCII (F16.8)	16	1

3.3 Satellite Information

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	MOE	Mean Brouwer Orbital Elements for the first scan line	1	112	112	Structure 3.3.1	112	1
2	Acquisition_Time	Acquisition date and time	113	144	32	ASCII	32	1
3	Orbit_No	Orbit number of data acquisition	145	152	8	ASCII	8	1
4	Node_Crossing_Lon	Equator crossing node longitude	153	168	16	ASCII (F16.8)	16	1
5	Node_Crossing_Time	Equator crossing time	169	200	32	ASCII	32	1
6	Nominal_Altitude	Nominal altitude	201	204	4	ASCII	4	1
7	Nominal_G_Speed	Nominal ground speed	205	220	16	ASCII (F16.8)	16	1
8	Instrument_Info	Instrument Information	221	392	172	Structure 3.3.2	172	1
9	BLANKS	Blanks for padding to equal record length	393	512	120	ASCII	1	120

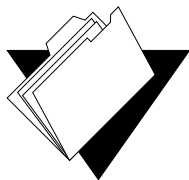
3.3.1 MOE Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Epoch_Date	Epoch Year and Day of Year	1	8	8	ASCII	8	1
2	Epoch_Time	Epoch Time in milliseconds of this day	9	16	8	ASCII	8	1
3	Semi_Major_Axis	Semi major axis	17	32	16	ASCII (F16.8)	16	1
4	Eccentricity	Eccentricity	33	48	16	ASCII (F16.8)	16	1
5	Inclination	Inclination	49	64	16	ASCII (F16.8)	16	1
6	Descending_Node	Descending node right ascension	65	80	16	ASCII (F16.8)	16	1
7	Perigree_Arg	Argument of perigree	81	96	16	ASCII (F16.8)	16	1
8	Mean_Anomaly	Mean Anomaly	97	112	16	ASCII (F16.8)	16	1

3.3.2 Instrument_Info Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Wavelengths	Upper and lower limits of wavelength range, 8 bytes per limit, 2 limits per band, 8 bands, starting with lower and upper limit band 1	221	348	128	ASCII	8	16
2	Bands_No	Number of bands	349	352	4	ASCII	4	1
3	Active_Bands_No	Total number of active bands	353	356	4	ASCII	4	1
4	Active_Bands	Active bands (1 byte per band, is set to 1 if the band is active otherwise 0)	357	364	8	ASCII	8	1
5	Scan_Rate	Sensor scan rate	365	368	4	ASCII	4	1
6	Active_Sample_Rate	Sensor active sampling rate	369	376	8	ASCII (F16.8)	8	1
7	Tilt_Angle	Tilt angle	377	392	16	ASCII (F16.8)	16	1

4.0 Imagery File



1	File Descriptor Record	21508 Bytes
2	Image Data Record 1	21508 Bytes
N+1	Image Data Record N	21508 Bytes

4.1 File Descriptor Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_FDR_ID_2	CEOS File Descriptor Record Identification	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	Document_Name	Identification of the product description document	17	28	12	ASCII	12	1
4	Document_Version	Version of product description document	29	32	4	ASCII	4	1
5	Software_ID	Software Release Number	33	44	12	ASCII	12	1
6	File_No_2	File Number	45	48	4	ASCII	4	1
7	File_Name_2	File Name	49	64	16	ASCII	16	1
8	BLANKS	CEOS reserved, filled with blanks (48 Blanks)	65	112	48	ASCII	1	48
9	CEOS_Flags	CEOS reserved Flags	113	116	4	ASCII	4	1
10	BLANKS	Blanks for padding to equal record length	117	21508	21392	ASCII	1	21392

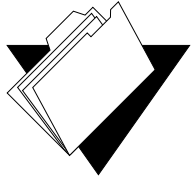
4.2 Image Data Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Scan_Line_Flag1	Scan line flag	1	2	2	Unsigned Integer*2	2	1
2	Scan_Line_Day	Scan line day (Julian)	3	4	2	Unsigned Integer*2	2	1
3	Scan_Line_Time	Scan line time milliseconds of day	5	8	4	Unsigned Integer*4	4	1
4	BLANKS	Empty byte to align the image on an even byte	9	9	1	ASCII	1	1
5	Spacecraft_ID	Spacecraft Identifier (2 times 16-bit words)	10	13	4	Unsigned Integer*2	2	2
6	Spacecraft_Time_Tag	Spacecraft Time Tag (4 times 16-bit words)	14	21	8	Unsigned Integer*2	2	4
7	Spacecraft_SOH	Spacecraft State of Health Telemetry (775 times 8-bit words)	22	796	775	Byte	1	775
8	Instrument_Telemetry	SeaWiFS Instrument and Ancillary Telemetry (44 times 16-bit words)	797	884	88	Unsigned Integer*2	2	44
9	Gain_TDI	Gain and TDI for the 8 Bands	885	900	16	Unsigned Integer*2	2	8
10	Start_Synch_Pixel	Start Synch Pixel for the 8 Bands	901	916	16	Unsigned Integer*2	2	8
11	Dark_Restore_Pixel	Dark Restore Pixels for the 8 Bands	917	932	16	Unsigned Integer*2	2	8
12	Image_Data	Pixel Interleaved SeaWiFS Data (1285 Pixels per Scan Line)	933	21492	20560	Structure 4.2.1	16	1285
13	Stop_Synch_Pixel	Stop Synch Pixels for the 8 Bands	21493	21508	16	Unsigned Integer*2	2	8

4.2.1 Image_Data Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Band_1	Band 1 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1
2	Band_2	Band 2 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1
3	Band_3	Band 3 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1
4	Band_4	Band 4 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1
5	Band_5	Band 5 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1
6	Band_6	Band 6 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1
7	Band_7	Band 7 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1
8	Band_8	Band 8 of the SeaWiFS sensor	N/A	N/A	2	Unsigned Integer*2	2	1

5.0 Annotation File



1	File Descriptor Record	2662 Bytes
2	Annotation Data Record 1	2662 Bytes
N+1	Annotation Data Record N	2662 Bytes

5.1 File Descriptor Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_FDR_ID_3	CEOS File Descriptor Record Identification	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	Document_Name	Identification of the product description document	17	28	12	ASCII	12	1
4	Document_Version	Version of product description document	29	32	4	ASCII	4	1
5	Software_ID	Software Release Number	33	44	12	ASCII	12	1
6	File_No_3	File Number	45	48	4	ASCII	4	1
7	File_Name_3	File Name	49	64	16	ASCII	16	1
8	BLANKS	CEOS reserved, filled with blanks (48 Blanks)	65	112	48	ASCII	1	48
9	CEOS_Flags	CEOS reserved Flags	113	116	4	ASCII	4	1
10	BLANKS	Blanks	117	180	64	ASCII	1	64
11	Tie_Point_Location	Ground control points location description	181	522	342	Structure 5.1.1	342	1
12	BLANKS	Blanks for padding to equal record length	523	2662	2140	ASCII	1	2140

5.1.1 Tie_Point_Location Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Tie_Point_1_Line	first line with tie point	181	184	4	ASCII	4	1
2	Tie_Point_Increment	line increment between lines having tie point location	185	188	4	ASCII	4	1
3	Tie_Point_No	number of tie points per line	189	192	4	ASCII	4	1
4	Tie_Pixel_Positions	list of pixel positions used as tie points	193	522	330	ASCII	6	55

5.2 Annotation Data Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Scan_Line_Flag2	Flag to determine if the state vector was interpolated	1	2	2	Unsigned Integer*2	2	1
2	Scan_Line_Day	Scan line day (Julian)	3	4	2	Unsigned Integer*2	2	1
3	Scan_Line_Time	Scan line time in milliseconds of day	5	8	4	Unsigned Integer*4	4	1
4	State_Vector	State Vector (each 3rd scan line original, otherwise interpolated)	9	32	24	Structure 5.2.1	24	1
5	Attitude_Angles	Attitude Angles	33	56	24	Structure 5.2.2	24	1
6	Navigation_Info	Navigation Information for the 55 tie points	57	1376	1320	Structure 5.2.3	24	55
7	Annotation_Flags	Annotation Flags (1285 Pixels) 1 Bit: Coastlines Flag 2 Bit: Boundaries Flag 3 Bit: Grid Flag 4 Bit: Classification Flag . 8 Bit: Classification Flag	1377	2661	1285	Byte	1	1285
8	BLANKS	Blanks for padding to even record length	2662	2662	1	ASCII	1	1

5.2.1 State_Vector Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	State_Vector_X	State Vector: X	9	12	4	Integer*4	4	1
2	State_Vector_Y	State Vector: Y	13	16	4	Integer*4	4	1
3	State_Vector_Z	State Vector: Z	17	20	4	Integer*4	4	1
4	State_Vector_X_Vel	State Vector: X velocity	21	24	4	Integer*4	4	1
5	State_Vector_Y_Vel	State Vector: Y velocity	25	28	4	Integer*4	4	1
6	State_Vector_Z_Vel	State Vector: Z velocity	29	32	4	Integer*4	4	1

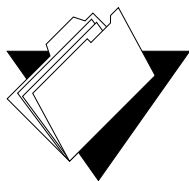
5.2.2 Attitude_Angles Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Attitude_Angle_Φ	Attitude Angular Position Φ	33	36	4	Integer*4	4	1
2	Attitude_Angle_Θ	Attitude Angular Position Θ	37	40	4	Integer*4	4	1
3	Attitude_Angle_Ψ	Attitude Angular Position Ψ	41	44	4	Integer*4	4	1
4	Attitude_Angle_ΦVel	Attitude Angular Rates Φ velocity	45	48	4	Integer*4	4	1
5	Attitude_Angle_ΘVel	Attitude Angular Rates Θ velocity	49	52	4	Integer*4	4	1
6	Attitude_Angle_ΨVel	Attitude Angular Rates Ψ velocity	53	56	4	Integer*4	4	1

5.2.3 Navigation_Info Structure

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	Tie_Point_Lat	Latitude for tie point	N/A	N/A	4	Integer*4	4	1
2	Tie_Point_Lon	Longitude for tie point	N/A	N/A	4	Integer*4	4	1
3	Tie_Point_Sun_Azi	Sun Angles azimuth for tie point	N/A	N/A	4	Integer*4	4	1
4	Tie_Point_Sun_Elev	Sun Angles elevation for tie point	N/A	N/A	4	Integer*4	4	1
5	Tie_Point_Sat_Azi	Satellite Angles azimuth for tie point	N/A	N/A	4	Integer*4	4	1
6	Tie_Point_Sat_Elev	Satellite Angles elevation for tie point	N/A	N/A	4	Integer*4	4	1

6.0 Null Volume Directory File



1

Null Volume Descriptor Record

360 Bytes

6.1 Null Volume Descriptor Record

#	Name	Short Description	Start (Byte)	Stop (Byte)	Length (Bytes)	Type	Size (Bytes)	Times
1	CEOS_NVDR_ID	CEOS Null Volume Descriptor Record Identification	1	12	12	Binary	12	1
2	BLANKS	Blanks	13	16	4	ASCII	1	4
3	Document_Name	Identification of the product description document	17	28	12	ASCII	12	1
4	Document_Version	Version of product description document	29	32	4	ASCII	4	1
5	Software_ID	Software Release Number	33	44	12	ASCII	12	1
6	BLANKS	Blanks	45	360	316	ASCII	1	316

7.0 Detailed Parameter Description

The following data description attributes are available to provide to the end user more detailed information about each data field/structure contained in the data product. In order to allow a systematic documentation those data description attributes follow a number of conventions, explained hereafter. Mandatory data description attributes need to be always documented. Optional data description attributes are only applicable to some data fields/data structures.

Meaning:	(mandatory)	Provides a detailed description of the meaning of the data field/data structure.
Type:	(mandatory)	Provides the data type of the data field/data structure, the length and if applicable also the encoding scheme.
Position:	(mandatory)	Provides the direct position of the data field/data structure within the data product, stating the File/the Record and the Start Position (in Bytes)
Permitted_Values:	(mandatory)	Provides all the permitted values of a data field. Multiple continuous ranges are documented using a comma as separator of several ranges, and a “-” between each minimum and maximum value, e.g.”00 - 99, 100 - 110”. Discrete values are documented as follows: “150, 200”. Combination of both are documented, as follows: “00 - 99, 100 - 110, 150, 200”. If the value of a specific data field is constant only it’s constant value is stated, e.g. “16.5”. This data description attribute is only applicable for data fields, for data structures the string “N/A” (Not Applicable) should be used.
Special_Instance:	(optional)	Provides the possibility to document special values of a data field. In brackets “()” a text is provided which explains the significance of a specific value (constant, range). This data description attribute can be repeated as often as required.
Unit:	(optional)	Provides the possibility to document the unit if measurement of the data field (only applicable to numerical values)
Default:	(optional)	Provides the possibility to document the value used for the data field in case of it’s unavailability.
Formation:	(optional)	Provides the possibility to document the formation of complex parameters, such as Character Strings or data structures.
Comment:	(optional)	Provides the possibility to comment or refer to additional references where information of the data field can be found.

All data fields/structures contained in the data product are listed here in alphabetical order:

Name	Data Description Attributes	
Active_Bands	Meaning:	This parameter contains information of a band’s activity during the time of measurement For each band 1 byte is used. The first byte (left) states the activity of band 1, the right most byte (byte 8) the activity of band 8. If the value of a band is 1 this implies that the band is active.
	Type:	ASCII Character String (8 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 357
	Permitted_Values:	00000000 - 11111111
	Special_Instance:	00000000 (no band is active)
	Special_Instance:	11111111 (all bands are active)
	Default:	\$\$\$\$\$\$\$

Name	Data Description Attributes	
Active_Bands_No	Meaning:	This parameter contains the total number of active bands during the time of measurement.
	Type:	ASCII Character String (4 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 353
	Permitted_Values:	\$\$\$0 - \$\$\$8
	Special_Instance:	\$\$\$0 (no band is active)
	Special_Instance:	\$\$\$8 (all bands are active)
	Default:	\$\$\$8
Active_Sample_Rate	Meaning:	The parameter states the active sample rate of the sensor (measured in pixels/second).
	Type:	ASCII Character String (8 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 369
	Permitted_Values:	\$\$\$7710
	Unit:	1/s
Actual_Scene_Lines	Meaning:	Number of lines in the scene. On average 1440 lines for a 4 minute scene are provided.
	Type:	ASCII Character String (4 Bytes)
	Position:	Leader File, Scene Header Record, Start Byte 289
	Permitted_Values:	\$\$\$0 - 9999
	Default:	1440
Acquisition_Facility	Meaning:	Identifier of the facility which performed the acquisition of the SeaWiFS data.
	Type:	ASCII Character String (12 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 149
	Permitted_Values:	“TMS\$NORWAY\$” (Tromsø, Norway), “DDE\$SCOTLAND” (Dundee, Scotland), “OPF\$GERMANY\$” (Oberpfaffenhofen, Germany), “SCZ\$ITALY\$\$\$” (Scanzano, Italy), “MP\$SPAIN\$\$\$” (maspalomas, Spain), “RUN\$FRANCE\$” (La Reunion, France) “ESR\$ITALY” (ESRIN, Italy)
Acquisition_Time	Meaning:	The date and time of data acquisition.
	Type:	ASCII Character String (32 Bytes)
	Position:	Leader File. Scene Header Record, Start Byte
	Formation:	{CCYYMMDDThhmmss,sss followed by blanks} where CC (century), YY (year), MM (month), DD (day), T (ISO standard date and time separator) hh (hour), mm (minutes), ss,sss (seconds, milliseconds (decimal fraction))

Name	Data Description Attributes	
Annotation_Flags	Meaning:	For each pixel (1285 pixels in one scan line) different annotation information is provided, currently the annotation information includes coastlines, boundaries, grid. For each different information one bit is reserved, the bit is set to 1 in the case that the information is existing.
	Type:	1285 * {1 Byte}
	Position:	Annotation File, Annotation Data Record, Start Byte 1377
	Formation:	<p>A geographical information extracted from DCW (Digital Chart of the World) is associated with each SeaWiFS pixel. Each pixel is represented by a byte where the meaning of the bits are defined as follows:</p> <p>1 Bit (LSB): Coastlines Flag (0 = not existing, 1 = existing)</p> <p>2 Bit: Boundaries Flag(0 = not existing, 1 = is existing)</p> <p>3 Bit: Grid Flag (0 = not existing, 1 = is existing)</p> <p>4 Bit: Land/Sea mask Flag (0=Sea, 1=Land)</p> <p>5 Bit: Classification Flag (not yet used)</p> <p>.</p> <p>8 Bit (MSB): Classification Flag (not yet used)</p>
Attitude_Angles	Meaning:	Attitude Angles
	Type:	Structure (24 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 33
Attitude_Angle_Φ	Meaning:	Attitude Angular Position Φ
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 33
	Unit:	micro radian
Attitude_Angle_Θ	Meaning:	Attitude Angular Position Θ
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 37
	Unit:	micro radian
Attitude_Angle_Ψ	Meaning:	Attitude Angular Position Ψ
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 41
	Unit:	micro radian
Attitude_Angle_ΦVel	Meaning:	Attitude Angular Rates Φ velocity
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 45
	Unit:	micro radian/s

Name	Data Description Attributes	
Attitude_Angle_ΘVel	Meaning:	Attitude Angular Rates Θ velocity
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 49
	Unit:	micro radiant/s
Attitude_Angle_ΨVel	Meaning:	Attitude Angular Rates Ψ velocity
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 53
	Unit:	micro radiant/s
Band_1	Meaning:	Digital raw counts of SeaWiFS instrument's band 1 (8 bands).
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 933 (for the first pixel)
	Permitted_Values:	[0, 1023]
Band_2	Meaning:	Digital raw counts of SeaWiFS instrument's band 2 (8 bands).
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 935 (for the first pixel)
	Permitted_Values:	[0, 1023]
Band_3	Meaning:	Digital raw counts of SeaWiFS instrument's band 3 (8 bands).
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 937 (for the first pixel)
	Permitted_Values:	[0, 1023]
Band_4	Meaning:	Digital raw counts of SeaWiFS instrument's band 4 (8 bands).
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 939 (for the first pixel)
	Permitted_Values:	[0, 1023]
Band_5	Meaning:	Digital raw counts of SeaWiFS instrument's band 5 (8 bands).
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 941 (for the first pixel)
	Permitted_Values:	[0, 1023]
Band_6	Meaning:	Digital raw counts of SeaWiFS instrument's band 6 (8 bands).
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 943 (for the first pixel)
	Permitted_Values:	[0, 1023]

Name	Data Description Attributes	
Band_7	Meaning: Type: Position: Permitted_Values:	Digital raw counts of SeaWiFS instrument's band 7 (8 bands). Unsigned Integer (2 Bytes) Imagery File, Image Data Record, Start Byte 945 (for the first pixel) [0, 1023]
Band_8	Meaning: Type: Position: Permitted_Values:	Digital raw counts of SeaWiFS instrument's band 8 (8 bands). Unsigned Integer (2 Bytes) Imagery File, Image Data Record, Start Byte 947 (for the first pixel) [0, 1023]
Bands_No	Meaning: Type: Position: Permitted_Values:	Number of nominal bands for SeaWiFS instrument (8 bands). ASCII Character String (4 Bytes) Leader File, Satellite Information Record, Start Byte \$\$\$8 (Constant)
BLANKS	Meaning: Type: Permitted_Values:	As a place holder blanks have been introduced in order to ensure consistency with the CEOS format family. The number of repetitions of the "\$" blank sign are provided in the table column "Times". ASCII character (1 Byte) \$
CEOS_Flags	Meaning: Type: Position: Position: Position: Permitted_Values:	In the SeaWiFS LAC 1A data product no use is made of the CEOS flagging system. The parameter is set to "NNNN" to keep consistency with formerly defined CEOS data products. ASCII Character String (4 Bytes) Leader File, File Descriptor Record, Start Byte 113 Imagery File, File Descriptor Record, Start Byte 113 Annotation File, File Descriptor Record, Start Byte 113 NNNN (Constant)
CEOS_FDR_ID_1	Meaning: Type: Position: Formation:	CEOS code to identify the File Descriptor Records. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products. 12 Bytes Leader File, File Descriptor Record, Start Byte 1 1 - 4 Bytes: Record Sequence Number (1) 5 - 5 Bytes: Volume Descriptor Record Code 1 (63) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (18) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: Leader File Descriptor Record Length (512)

Name	Data Description Attributes	
CEOS_FDR_ID_2	Meaning: Type: Position: Formation:	CEOS code to identify the File Descriptor Records. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products. 12 Bytes Imagery File, File Descriptor Record, Start Byte 1 1 - 4 Bytes: Record Sequence Number (1) 5 - 5 Bytes: Volume Descriptor Record Code 1 (63) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (18) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: Imagery File Descriptor Record Length (21508)
CEOS_FDR_ID_3	Meaning: Type: Position: Formation:	CEOS code to identify the File Descriptor Records. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products. 12 Bytes Annotation File, File Descriptor Record, Start Byte 1 1 - 4 Bytes: Record Sequence Number (1) 5 - 5 Bytes: Volume Descriptor Record Code 1 (63) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (18) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: Annotation File Descriptor Record Length (2662)
CEOS_FPR_ID_1	Meaning: Type: Position: Formation:	CEOS code to identify the File Pointer Records. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products. 12 Bytes Volume Directory File, Leader Pointer Record, Start Byte 1 1 - 4 Bytes: Record Sequence Number (2) 5 - 5 Bytes: Volume Descriptor Record Code 1 (219) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (18) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: File Pointer Record Length (360)

Name	Data Description Attributes	
CEOS_FPR_ID_2	Meaning: Type: Position: Formation:	CEOS code to identify the File Pointer Records. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products. 12 Bytes Volume Directory File, Imagery File Pointer Record, Start Byte 1 1 - 4 Bytes: Record Sequence Number (3) 5 - 5 Bytes: Volume Descriptor Record Code 1 (219) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (18) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: File Pointer Record Length (360)
CEOS_FPR_ID_3	Meaning: Type: Position: Formation:	CEOS code to identify the File Pointer Records. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products. 12 Bytes Volume Directory File, Annotation File Pointer Record, Start Byte 1 1 - 4 Bytes: Record Sequence Number (4) 5 - 5 Bytes: Volume Descriptor Record Code 1 (219) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (18) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: File Pointer Record Length (360)
CEOS_NVDR_ID	Meaning: Type: Position: Formation:	CEOS code to identify the Null Volume Descriptor Record. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products. 12 Bytes Null Volume Directory File, Null Volume Descriptor Record, Start Byte 1 1 - 4 Bytes: Record Sequence Number (1) 5 - 5 Bytes: Volume Descriptor Record Code 1 (192) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (63) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: Null Volume Descriptor Record Length (360)

Name	Data Description Attributes	
CEOS_VDR_ID	Meaning:	CEOS code to identify the Volume Descriptor Record. This structure is only used to identify the CEOS records used and to keep consistency to former CEOS data products.
	Type:	12 Bytes
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 1
	Formation:	1 - 4 Bytes: Record Sequence Number (1) 5 - 5 Bytes: Volume Descriptor Record Code 1 (192) 6 - 6 Bytes: Volume Descriptor Record Code 2 (192) 7 - 7 Bytes: Volume Descriptor Record Code 3 (18) 8 - 8 Bytes: Volume Descriptor Record Code 4 (18) 9-12 Bytes: Volume Descriptor Record Length (360)
Centre_Coordinates	Meaning:	Latitude and Longitude at the central point of the scene.
	Type:	Structure (32 Bytes)
	Position:	Leader File, Scene Header Record, Start Byte 1
	Formation:	{Centre_Lat, Centre_Lon}
Centre_Lat	Meaning:	Latitude at the central point of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File. Scene Header Record, Start Byte 1
	Permitted_Values:	\$\$\$-90.00000000 - \$\$\$90.00000000
	Unit:	Degree
Centre_Line_No	Meaning:	Line number of the scene centre.
	Type:	ASCII Character String (8 Bytes)
	Position:	Leader File. Scene Header Record, Start Byte 49
	Permitted_Values:	\$\$\$\$\$1 - \$\$\$1440
	Default:	\$\$\$\$\$720 (1440 scene lines for a 4 minute scene)
Centre_Lon	Meaning:	Longitude at the central point of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte 17
	Permitted_Values:	\$\$\$-180.00000000 - \$\$\$180.00000000
	Unit:	Degree
Centre_Pixel_No	Meaning:	Pixel number where Centre_Lat and Centre_Lon are calculated
	Type:	ASCII Character String (8 bytes)
	Position:	Leader File, Scene Header Record, Start Byte 57
	Permitted_Values:	\$\$\$\$\$\$0 - \$\$\$1285
	Default:	\$\$\$\$\$643

Name	Data Description Attributes	
Centre_Sun_Elev	Meaning:	Sun elevation angle value at the scene centre pixel
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte 33
	Permitted_Values:	\$\$\$-180.00000000 - \$\$\$180.00000000
	Unit:	Degree
Centre_Time	Meaning:	Date and Time value of the Centre_Line_No
	Type:	ASCII Character String (32 Bytes)
	Position:	Leader File, Scene Header Record, Start Byte 65
	Formation:	{CCYYMMDDThhmmss,sss followed by Blanks}
Dark_Restore_Pixel	Meaning:	Dark restore pixel for the 8 SeaWiFS bands as provided in the HRPT frame
	Type:	8 * {Unsigned Integer (2 Bytes)}
	Position:	Imagery File, Image Data Record, Start Byte 917
	Permitted_Values:	0 - 1023
Descending_Node	Meaning:	Descending node right ascension
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte 65
	Unit:	Degree
Document_Name	Meaning:	The name of the document describing this format.
	Type:	ASCII Character String (12 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 17
	Position:	Leader File, File Descriptor Record, Start Byte 17
	Position:	Imagery File, File Descriptor Record, Start Byte 17
	Position:	Annotation File, File Descriptor Record, Start Byte 17
	Position:	Null Volume Directory File, Null Volume Descriptor Record, Start Byte 17
	Permitted_Values:	EOFS-IDF-002
Document_Version	Meaning:	The version of the document describing this format.
	Type:	ASCII Character String (4 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 17
	Position:	Leader File, File Descriptor Record, Start Byte 17
	Position:	Imagery File, File Descriptor Record, Start Byte 17
	Position:	Annotation File, File Descriptor Record, Start Byte 17
	Position:	Null Volume Directory File, Null Volume Descriptor Record, Start Byte 17
	Permitted_Values:	\$2.2

Name	Data Description Attributes	
Eccentricity	Meaning:	Eccentricity
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte 33
Epoch_Date	Meaning:	Epoch year and days of the MOE
	Type:	ASCII Character String (8 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 1
	Formation:	{CCYYDDD followed by blanks}
Epoch_Time	Meaning:	Epoch time in milliseconds in the Epoch_Date
	Type:	ASCII Character String (8 bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 9
	Permitted_Values:	\$\$\$\$\$\$0 - 86400000
	Unit:	millisecond
FDR_Length_1	Meaning:	The length of the file descriptor record in the corresponding data file.
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Leader File Pointer Record, Start Byte 109
	Permitted_Values:	\$\$\$\$\$512
FDR_Length_2	Meaning:	The length of the file descriptor record in the corresponding data file.
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Imagery File Pointer Record, Start Byte 109
	Permitted_Values:	\$\$\$21508
FDR_Length_3	Meaning:	The length of the file descriptor record in the corresponding data file.
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Annotation File Pointer Record, Start Byte 109
	Permitted_Values:	\$\$\$\$2662
File_Name_1	Meaning:	The name of the file. The convention used implies "SeaStar 1 - SeaWIFS - LEAD/IMAG/ANNO"
	Type:	ASCII Character String (16 Bytes)
	Position:	Volume Directory File, Leader File Pointer Record, Start Byte 21
	Position:	Leader File, File Descriptor Record, Start Byte 49
	Permitted_Values:	SS1\$SEAWIFS\$LEAD

Name	Data Description Attributes	
File_Name_2	Meaning:	The name of the file. The convention used implies "SeaStar 1 - SeaWIFS - LEAD/IMAG/ANNO"
	Type:	ASCII Character String (16 Bytes)
	Position:	Volume Directory File, Imagery File Pointer Record, Start Byte 21
	Position:	Imagery File, File Descriptor Record, Start Byte 49
	Permitted_Values:	SS1\$SEAWIFS\$IMAG
File_Name_3	Meaning:	The name of the file. The convention used implies "SeaStar 1 - SeaWIFS - LEAD/IMAG/ANNO"
	Type:	ASCII Character String (16 Bytes)
	Position:	Volume Directory File, Annotation File Pointer Record, Start Byte 21
	Position:	Annotation File, File Descriptor Record, Start Byte 49
	Permitted_Values:	SS1\$SEAWIFS\$ANNO
File_No_1	Meaning:	The File number identifies the sequence of the file within the data product.
	Type:	ASCII Character String (4 Bytes)
	Position:	Volume Directory File, Leader File Pointer Record, Start Byte 17
	Position:	Leader File, File Descriptor Record, Start Byte 45
	Permitted_Values:	\$\$\$2
File_No_2	Meaning:	The File number identifies the sequence of the file within the data product.
	Type:	ASCII Character String (4 Bytes)
	Position:	Volume Directory File, Imagery File Pointer Record, Start Byte 17
	Position:	Imagery File, File Descriptor Record, Start Byte 45
	Permitted_Values:	\$\$\$3
File_No_3	Meaning:	The File number identifies the sequence of the file within the data product.
	Type:	ASCII Character String (4 Bytes)
	Position:	Volume Directory File, Annotation File Pointer Record, Start Byte 17
	Position:	Annotation File, File Descriptor Record, Start Byte 45
	Permitted_Values:	\$\$\$4
Gain_TDI	Meaning:	Gain & TDI as provided in the HRPT frame
	Type:	8 * {Unsigned Integer (2 Bytes)}
	Position:	Imagery File, Image Data Record, Start Byte 885
Image_Data	Meaning:	Image data pixels for the 8 SeaWiFS bands as provided in the HRPT frame
	Type:	1285 * {8* {Unsigned Integer (2 Bytes)}}
	Position:	Imagery File, Image Data Record, Start Byte 933
	Permitted_Values:	0 - 1023 (for each pixel)

Name	Data Description Attributes	
Inclination	Meaning:	Inclination
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte 49
	Unit:	Degree
Instrument_Info	Meaning:	Data structure providing information about the instrument, such as the wavelength range, scan rate, etc.
	Type:	Structure (172 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 233
Instrument_Telemetry	Meaning:	Instrument or Ancillary Telemetry as provided in the HRPT frame
	Type:	44* {Unsigned Integer (2 Bytes)}
	Position:	Imagery File, Image Data Record, Start Byte 9
Lower_Left_Lat	Meaning:	Latitude of the lower left corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-90.00000000 - \$\$\$90.00000000
	Unit:	Degree
Lower_Left_Lon	Meaning:	Longitude of the lower left corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-180.00000000 - \$\$\$180.00000000
	Unit:	Degree
Lower_Right_Lat	Meaning:	Latitude of the lower right corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-90.00000000 - \$\$\$90.00000000
	Unit:	Degree
Lower_Right_Lon	Meaning:	Longitude of the lower right corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-180.00000000 - \$\$\$180.00000000
	Unit:	Degree

Name	Data Description Attributes	
Max_Rec_Length_1	Meaning:	The maximum length of a data record in the corresponding data file
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Leader File Pointer Record, Start Byte 117
	Default:	\$\$\$\$\$512
Max_Rec_Length_2	Meaning:	The maximum length of a data record in the corresponding data file
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Imagery File Pointer Record, Start Byte 117
	Default:	\$\$\$21508
Max_Rec_Length_3	Meaning:	The maximum length of a data record in the corresponding data file
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Annotation File Pointer Record, Start Byte 117
	Default:	\$\$\$\$2662
Mean_Anomaly	Meaning:	Mean Anomaly
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte 97
	Unit:	Degree
Media_ID	Meaning:	The identifier of the source product.
	Type:	ASCII Character String (16 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 45
MOE	Meaning:	Main Orbital Elements calculated for the first line of the pass from which the scene has been extracted
	Type:	Structure (112 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 1
Navigation_Info	Meaning:	Coordinates (lat, lon), Sun and satellite angles for each tie point
	Type:	Structure (24 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 57
Node_Crossing_Lon	Meaning:	Equator crossing longitude
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte
	Permitted_Values:	\$\$\$-180.00000000 - \$\$\$180.00000000
	Unit:	Degree

Name	Data Description Attributes	
Node_Crossing_Time	Meaning:	Equator crossing longitude
	Type:	ASCII Character String (32 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte
	Formation:	(CCYYMMDDThhmmss,sss followed by Blanks)
Nominal_Altitude	Meaning:	Altitude nominal of the SeaStar satellite
	Type:	ASCII Character String (4 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte 201
	Permitted_Values:	\$705 (constant)
	Unit:	km
Nominal_G_Speed	Meaning:	Nominal ground speed of the SeaStar satellite
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte 205
	Permitted_Values:	\$\$\$\$\$6.6660000
	Unit:	km/s
Orbit_No	Meaning:	Absolute orbit number
	Type:	ASCII Character String (8 Bytes)
	Position:	Leader File, Satellite Information Record, Start Byte
	Permitted_Values:	\$\$\$\$\$\$0 - \$\$\$99999
Perigree_Arg	Meaning:	
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte
	Unit:	Degree
Product_Files	Meaning:	Number of data files belonging to the SeaWiFS LAC 1A data product (5 data product files)
	Type:	ASCII Character String (4 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 161
	Permitted_Values:	\$\$\$5

Name	Data Description Attributes	
Product_ID	Meaning:	Identifier of the current data product.
	Type:	ASCII Character String (16 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 61
	Formation:	YYMMDDhhmmFFSS - YY for acquisition year - MM for acquisition month in the year - DD for acquisition day in the month - hh for acquisition hour time in the day - mm for acquisition minute time in the hour - FF for the acquisition facility identifier: TM (Tromsoe), DD (Dundee), OP (Oberpfaffenhofen), SC (Scanzano), MP (Maspalomas), RU (La Reunion), ES (Frascati) - SS for the satellite identifier: S1 (SeaStar), N9 (NOAA 09), N0 (NOAA 10), N2 (NOAA 12), N1 (NOAA 11), N4 (NOAA 14)
Processing_Country	Meaning:	Identifier of the processing country of the data product.
	Type:	ASCII Character String (12 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 129
	Permitted_Values:	NORWAY\$\$\$\$\$, SCOTLAND\$\$\$\$\$, GREATBRITAIN, GERMANY\$\$\$\$\$, ITALY\$\$\$\$\$\$\$, SPAIN\$\$\$\$\$\$\$, FRANCE\$\$\$\$\$\$
Processing_Facilty	Meaning:	Identifier of the processing facility of the data product.
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 141
	Permitted_Values:	TMS\$\$\$\$\$, DDE\$\$\$\$\$, OPF\$\$\$\$\$, SCZ\$\$\$\$\$, MPS\$\$\$\$\$, RUN\$\$\$\$\$, ESR\$\$\$\$\$
Processing_Time	Meaning:	The time of product processing (following the date/time conventions from ISO)
	Type:	ASCII Character String (16 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 113
	Formation:	{CCYYMMDDThhmmss followed by Blanks}
Product_Type	Meaning:	Identifier of the type of data product.
	Type:	ASCII Character String (16 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 77
	Permitted_Values:	SS1\$SWF\$LEVEL\$1A
Records_1	Meaning:	The number of records of the corresponding data file.
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Leader File Pointer Record, Start Byte 101
	Permitted_Values:	\$\$\$\$\$\$3

Name	Data Description Attributes	
Records_2	Meaning:	The number of records of the corresponding data file.
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Imagery File Pointer Record, Start Byte 101
	Permitted_Values:	\$\$\$\$1441 (for a standard 4 minutes length product)
Records_3	Meaning:	The number of records of the corresponding data file.
	Type:	ASCII Character String (8 Bytes)
	Position:	Volume Directory File, Annotation File Pointer Record, Start Byte 101
	Permitted_Values:	\$\$\$\$1441 (for a standard 4 minutes length product)
Scan_Line_Day	Meaning:	Julian Day of this scan line, the Julian Day is calculated from the 13 January 1993 at 00:00:00.0 UTC Day Counter = Julian Date - 2449000.5
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 3
	Unit:	day
Scan_Line_Flag1	Meaning:	Scan line flag
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File, Image Data Record, Start Byte 1
	Permitted_Values:	0 - 7
	Formation:	<p>Each SeaWiFS scan line has a 2-bytes flag describing the errors detected during the time quality check</p> <p>Each bit represent a different error detected, if flag=0 no error</p> <p>1 Bit (LSB): Data Gap (1=this line is an empty line added replacing a line missing during the acquisition)</p> <p>2 Bit: Time bad (1=The time value of this line has been rectified because it was wrong)</p> <p>3 Bit: Day bad (1=The day value of this line has been rectified because it was wrong)</p> <p>4-8 Bits: Not used.</p> <p>9-16 Bits: Not used</p>

Name	Data Description Attributes	
Scan_Line_Flag2	Meaning: Type: Position: Permitted_Values: Formation:	Flag to determine if the state vector was interpolated (each 3 lines only the original state vector is provided, otherwise interpolated) Unsigned Integer (2 Bytes) Annotation File, Annotation Data Record, Start Byte 1 0 -1023 Identical to Scan_Line_Flag1 for the first byte, plus indicates the lines where the navigation information has been interpolated Each bit represent a different error detected, if flag=0 no error 1 Bit (LSB): Data Gap (1=this line is an empty line replacing a line missing during the acquisition) 2 Bit: Time bad (1=The time value of this line has been rectified, 0=The time value is extracted from HRPT stream) 3 Bit: Day bad (1=The day value of this line has been rectified, 0=The day value is extracted from HRPT stream) 4-8 Bits: Not used. 9 Bit: Navigation Data interpolated (1=Interpolated, 0=calculated) 10 Bit: State Vector Interpolated (1=Interpolated, 0=extracted from HRPT stream) 11-16 (MSB) Bits: Not used
Scan_Line_Time	Meaning: Type: Position: Permitted_Values: Unit:	Time in milliseconds of this scan line Unsigned Integer (4 Bytes) Imagery File, Image Data Record, Start Byte 5 0 - 86400000 millisecond (ms)
Scan_Rate	Meaning: Type: Position: Permitted_Values: Unit:	Scan Rate measured in lines/second. ASCII Character String (4 Bytes) Leader File, Satellite Information Record, Start Byte 365 \$\$\$6 (constant) 1/s
Scene_Coordinates	Meaning: Type: Position:	The 4 scene corners (latitude and longitude) coordinates Structure (128 Bytes) Leader File, Scene Header Record, Start Byte 161
Scene_Start_Time	Meaning: Type: Position: Formation:	Date and time of the first line of the scene ASCII Character String (32 Bytes) Leader File, Scene Header Record, Start Byte 97 (CCYYMMDDThhmmss,sss followed by Blanks)
Scene_Stop_Time	Meaning: Type: Position: Formation:	Date and time of the last line of the scene ASCII Character String (32 Bytes) Leader File, Scene Header Record, Start Byte 129 (CCYYMMDDThhmmss,sss followed by Blanks)

Name	Data Description Attributes	
Semi_Major_Axis	Meaning:	Semi major axis
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte 17
	Unit:	km
Software_ID	Meaning:	Software Release Number
	Type:	ASCII Character String (12 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 33
	Position:	Leader File, File Descriptor Record, Start Byte 33
	Position:	Imagery File, File Descriptor Record, Start Byte 33
	Position:	Annotation File, File Descriptor Record, Start Byte 33
	Permitted_Values:	SEASHARK\$1.0
Spacecraft_ID	Meaning:	Spacecraft Identifier as provided in the HRPT frame
	Type:	Unsigned Integer (2 Bytes)
	Position:	Imagery File. Image Data Record, Start Byte 9
Spacecraft_SOH	Meaning:	Spacecraft State of Health Telemetry as provided in the HRPT frame
	Type:	775 * {(Integer (1 Byte))}
	Position:	Imagery File. Image Data Record, Start Byte 22
Spacecraft_Time_Tag	Meaning:	Spacecraft Time Tag as provided in the HRPT frame
	Type:	4 * {Unsigned Integer (2 Bytes)}
	Position:	Imagery File, Image Data Record, Start Byte 14
Start_Synch_Pixel	Meaning:	Start-synch pixel for the 8 SeaWiFS bands as provided in the HRPT frame
	Type:	8* {Unsigned Integer (2 Bytes)}
	Position:	Imagery File, Image Data Record, Start Byte
	Permitted_Values:	0 -1023
State_Vector	Meaning:	SeaStar Satellite State Vectors for this scan line, the State vectors are in ECEF reference
	Type:	Structure (24 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 9
State_Vector_X	Meaning:	Orbit Position data in the X direction
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 9
	Unit:	meter

Name	Data Description Attributes	
State_Vector_Y	Meaning:	Orbit Position data in the Y direction
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 13
	Unit:	meter
State_Vector_Z	Meaning:	Orbit Position data in the Z direction
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 17
State_Vector_X_Vel	Meaning:	Orbit Velocity data in the X direction
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 21
	Unit:	meter/second
State_Vector_Y_Vel	Meaning:	Orbit Velocity data in the Y direction
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 25
	Unit:	meter/second
State_Vector_Z_Vel	Meaning:	Orbit Velocity data in the Z direction
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 29
	Unit:	meter/second
Stop_Synch_Pixel	Meaning:	Stop-synch pixel for the 8 SeaWiFS bands as provided in the HRPT frame
	Type:	8* {Unsigned Integer (2 Bytes)}
	Position:	Imagery File, Image Data Record, Start Byte
	Permitted_Values:	0 - 1023
Tie_Point_Increment	Meaning:	Line number increment between two lines having the tie points location included (the tie points are provided for every line)
	Type:	ASCII Character String (4 Bytes)
	Position:	Annotation File, Image File Descriptor Record, Start Byte
	Permitted_Values:	\$\$\$1 (constant)
Tie_Point_Lat	Meaning:	Latitude of the tie point
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 57
	Permitted_Values:	-90000 - +90000
	Unit:	1/1000 degree

Name	Data Description Attributes	
Tie_Point_Location	Meaning:	Structure containing information about the tie points
	Type:	Structure (342 Bytes)
	Position:	Annotation File, File Descriptor Record, Start Byte 181
Tie_Point_Lon	Meaning:	Longitude of the tie point
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 61
	Permitted_Values:	-180000 - +180000
	Unit:	1/1000 degree
Tie_Point_No	Meaning:	Number of tie points provided by line. The number currently used is 55.
	Type:	ASCII Character String (4 Bytes)
	Position:	Annotation File, File Descriptor Record, Start Byte 189
	Permitted_Values:	\$\$55 (constant)
Tie_Pixel_Positions	Meaning:	List of pixels positions where the tie points are calculated
	Type:	55 * {ASCII Character String (6 Bytes)}
	Position:	Annotation File, File Descriptor Record, Start Byte 193
	Permitted_Values:	\$\$\$\$\$1 - \$\$1285
Tie_Point_Sat_Azi	Meaning:	SeaStar Satellite Azimuth angle value at the tie point
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 73
	Permitted_Values:	-180000 - +180000
	Unit:	1/1000 degree
Tie_Point_Sat_Elev	Meaning:	SeaStar Satellite Elevation angle value at the tie point
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 77
	Permitted_Values:	-180000 - +180000
	Unit:	1/1000 degree
Tie_Point_Sun_Azi	Meaning:	Sun Azimuth angle value at the tie point
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 65
	Permitted_Values:	-180000 - +180000
	Unit:	1/1000 degree

Name	Data Description Attributes	
Tie_Point_Sun_Elev	Meaning:	Sun Elevation angle value at the tie point
	Type:	Integer (4 Bytes)
	Position:	Annotation File, Annotation Data Record, Start Byte 69
	Permitted_Values:	-180000 - +180000
	Unit:	1/1000 degree
Tie_Point_1_Line	Meaning:	First line number with tie points
	Type:	ASCII Character String (4 Bytes)
	Position:	Annotation File, File Descriptor Record, Start Byte 181
	Permitted_Values:	\$\$\$1
Tilt_Angle	Meaning:	Tilt angle value of the SeaWiFS instrument during the scene acquisition
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Satellite Information Record, Start Byte 377
	Permitted_Values:	\$\$\$\$-20.00000000, \$\$\$\$\$0.00000000, \$\$\$\$+20.00000000
	Unit:	Degree
Upper_Left_Lat	Meaning:	Latitude of the upper left corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-90.00000000 - \$\$\$\$90.00000000
	Unit:	Degree
Upper_Left_Lon	Meaning:	Longitude of the upper left corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-180.00000000 - \$\$\$180.00000000
	Unit:	Degree
Upper_Right_Lat	Meaning:	Latitude of the upper right corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-90.00000000 - \$\$\$\$90.00000000
	Unit:	Degree

Name	Data Description Attributes	
Upper_Right_Lon	Meaning:	Longitude of the upper right corner of the scene
	Type:	ASCII Character String (16 Bytes), following the F(16.8) notation
	Position:	Leader File, Scene Header Record, Start Byte
	Permitted_Values:	\$\$\$-180.00000000 - \$\$\$180.00000000
	Unit:	Degree
VDF_Records	Meaning:	Number of records in the Volume Directory File
	Type:	ASCII Character String (4 Bytes)
	Position:	Volume Directory File, Volume Descriptor Record, Start Byte 165
	Permitted_Values:	\$\$\$4
Wavelengths	Meaning:	Upper and lower limits of wavelength, for the 8 nominal bands of SeaWiFS instrument.
	Type:	16 * {ASCII Character String (8 Bytes)}
	Position:	Leader File, Satellite Information Record, Start Byte
	Unit:	nanometer