Standard Archive Format for Europe

JERS Specialisation for Level 0 products

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1. Introduction

1.1. Purpose and scope

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

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

The current book is the specialisation control book for JERS Level-0 products.

1.2. Book organisation

The specialisation control book for JERS Level-0 products and auxiliary files is organized as follows:

Chapter 1: Introduction	Introductory part of the document.
Chapter 2: Target of preservation	Description of the target of preservation for L0 products.
Chapter 3: Data Structures	Specification of the simple and complex types that are used to represent the structure of the products and auxiliary file types independently of the mission instrument to which they are associated.

1.3. Acronyms and abbreviations

DFDL	Data Format Description Language
GNU	GNU is Not Unix
PCM	Pulse Code Modulation
W3C	World Wide Web Consortium
XML	eXtensible Mark-up Language

2. Target of preservation

Some of the JERS L0 products in native format are available in tar format (filenames with ".TAR" extension). However, the targets of preservation considered in this SAFE specialisation are the contents of those compressed files, i.e. the files which are stored within the tar files.

Any product in native format must be unpackaged and decompressed before being converted into SAFE and the SAFE Packages will only contain the unpackaged and decompressed files. This is because the representation information schemas that are provided along with this specialisation describe the unpackaged and decompressed files, not the tar/gzip format (there would be limitations in doing this, as explained in the SAFE Core Specifications).

The following table summarises the list of product types in scope and points the reader to the sections in the document where the information about the main structure of the file can be found:

File Types	Structure specification
JSA_RAW_0P	See section 3.1.1
JSA_OPS_0P	See section 3.1.2

Table 1: File Types Specification Index

3. Data Structures

The information included in this chapter has been generated using the specifications defined by the DFDL schemas that represent the structure of the L0 products.

The representation information is described by means of complex structures that make use of simple types to represent the whole content of a given file type. The following sub-sections provide a detailed description of those types.

The diagrams included in this document provide an overview of the structure of the products by depicting the schemas which provide their representation information.

3.1. JERS L0 Products

The following subsections provide a description of the data structures for the JERS SAR (JSA_RAW_0P) and JERS OPS (JSA_OPS_0P) products in scope.

All JERS products are preserved in WILMA format containing a complete transcribed satellite imaging sequence (a passage), with all related information. This information is split in the following files:

Description	Filename
Block Address Descriptor	DTBlock.dat
Orbit Data	DTOrbitFile.dat
Pass Identification Header	DTPassId.dat
Segment Descriptor	DTSegment.dat
Statistics File	DTStatisticFile.dat
Payload Correction	DTTelemetry.dat
User Header	DTUserHeader.dat
Sensor Acquired Data	DTVideoData.dat
State Vector File	DTOrbitFile.dat

3.1.1. JSA_RAW_0P

3.1.1.1. DTBlock

This file contains the description of all the blocks in which the pass has been divided and written. It is composed by a variable number of identical units. Each unit describes completely one satellite data block and contains all information to address any segment or any frame within the “Sensor Acquired Data” file. It contains block number of the video data block, the starting time of the first satellite format in the block and the number of swaths contained.

The structure is repeated as many times as the number of blocks recorded in the file. The number of items and the length are specified in the "DTUserHeader” file.

The next figure provides a high level overview of the complex structures used to represent the information of the DTBlock file:

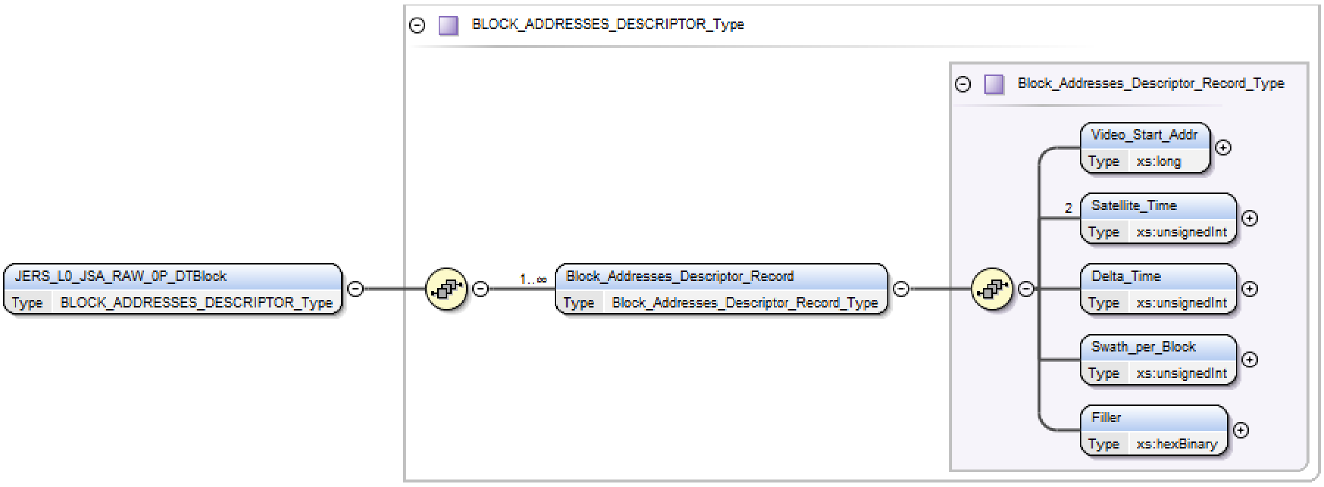

Figure 1: DFDL schema organisation for JSA_RAW_0P product - DTBlock

3.1.1.1.1. Root Element

#	Name/Description	Format
1	BLOCK ADDRESSES DESCRIPTOR file This file contains the description of all the blocks in which the pass has been divided and written on tape. It is composed by a variable number of identical units. Each unit describes completely one satellite data block and contains all information to address any segment or any frame within the "Sensor Acquired Data" file. It contains block number of the video data block, the starting time of the first satellite format in the block and the number of swaths contained. The structure is repeated as many times as the number of blocks recorded in the file. The number of items and the length are specified into the "User Header file - Pointer to Tape Data Structure Description Section" (Block Addresses section).	BLOCK_ADDRESSES_DESCRIPTOR_Type

Table 2: JERS_L0_JSA_RAW_0P_DTBlock Specification

3.1.1.1.2. Complex Types

3.1.1.1.2.1.BLOCK_ADDRESSES_DESCRIPTOR_Type

#	Name/Description	Format
1	**Block_Addresses_Descriptor_Record**	Block_Addresses_Descriptor_Record_Type Min Occurs: 1 Max Occurs: unbounded

Table 3: BLOCK_ADDRESSES_DESCRIPTOR_Type Specification

3.1.1.1.2.2.Block_Addresses_Descriptor_Record_Type

#	Name/Description	Format
1	**Video_Start_Addr** Block number of the video data block	xs:long 4 bytes
2	**Satellite_Time** Time of current block. The time is expressed in sensor dependent mode, as follows: Sat_Time[0] = Binary Counter of first line in current block Sat_Time[1] = Binary Counter of last line in current block	xs:unsignedInt Min Occurs: 2 Max Occurs: 2 4 bytes
3	**Delta_Time** Time distance between start of acquisition (first block of the file) and current block start The delta time is expressed in sensor dependent mode, as "Format counter of first format in current block"	xs:unsignedInt 4 bytes
4	**Swath_per_Block** Number of swaths per block	xs:unsignedInt 4 bytes
5	**Filler** Available fields	xs:hexBinary 12bytes

Table 4: Block_Addresses_Descriptor_Record_Type Specification

3.1.1.2. DTOrbitFile

The DTOrbitFile contains information about position, velocity of satellite and times closest to start acquisition. There is only one “Orbital Data Record” for each pass. The State Vector is referenced to the inertial co-ordinate system called ECITOD (Earth Centred Inertial True Of Date).

The next figure provides a high level overview of the complex structures used to represent the information of the DTOrbitFile:

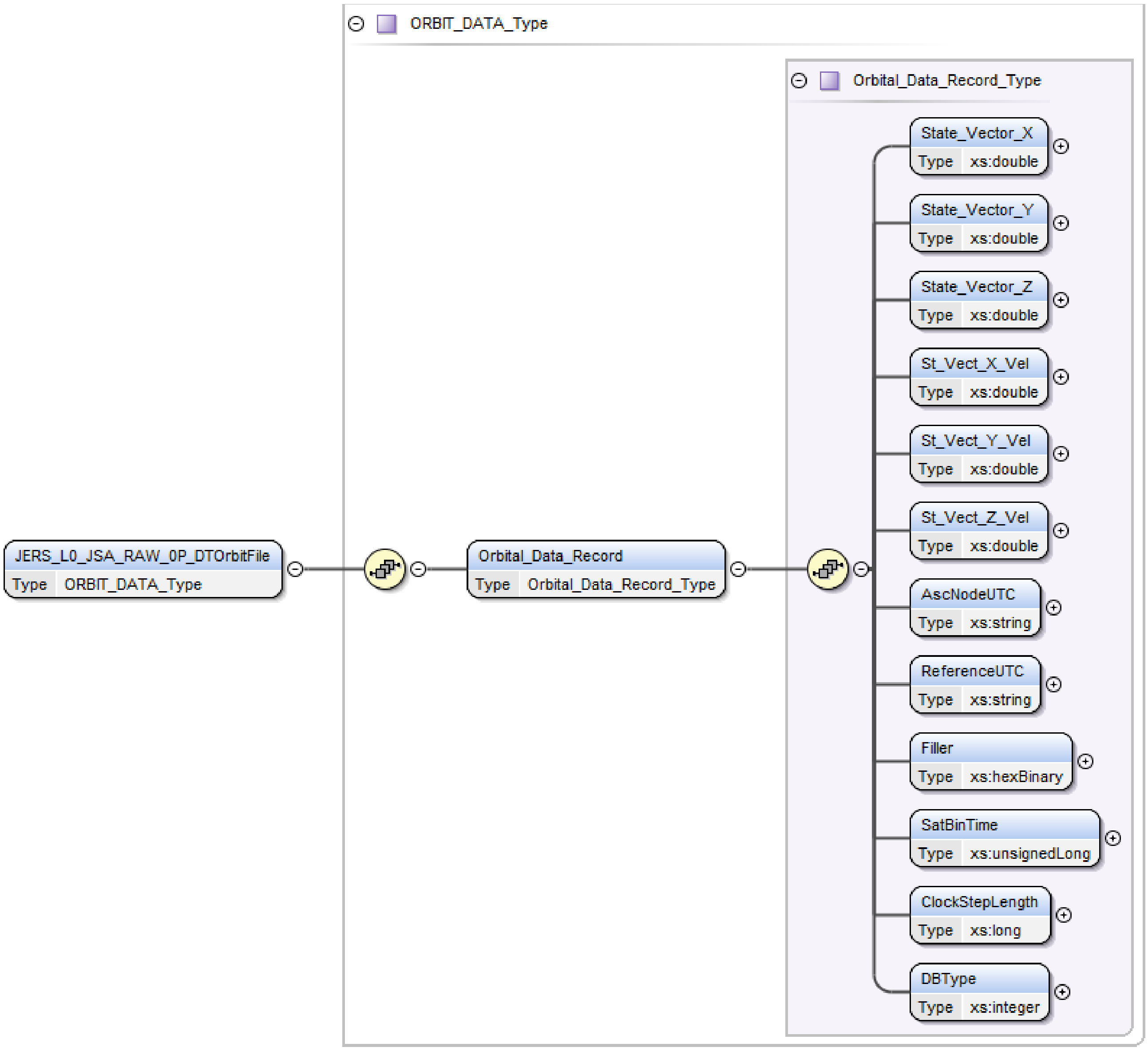

Figure 2: DFDL schema organisation for JSA_RAW_0P product - DTOrbitFile

3.1.1.2.1. Root Element

#	Name/Description	Format
1	ORBIT DATA file This structure is composed by a series of blocks containing information about position, velocity of satellite and times closest to start acquisition. In the JERS case there is only one "Orbital Data Record" for each pass, i.e. for each Transcription Area. The State Vector is referenced to the inertial co-ordinate system called ECITOD (Earth Centred Inertial True Of Date).	ORBIT_DATA_Type

Table 5: JERS_L0_JSA_RAW_0P_DTOrbitFile Specification

3.1.1.2.2. Complex Types

3.1.1.2.2.1.ORBIT_DATA_Type

#	Name/Description	Format
1	**Orbital_Data_Record**	Orbital_Data_Record_Type

Table 6: ORBIT_DATA_Type Specification

3.1.1.2.2.2.Orbital_Data_Record_Type

#	Name/Description	Format
1	**State_Vector_X** X component of satellite position	xs:double 8 bytes
2	**State_Vector_Y** Y component of satellite position	xs:double 8 bytes
3	**State_Vector_Z** Z component of satellite position	xs:double 8 bytes
4	**St_Vect_X_Vel** Vx component of sat. velocity	xs:double 8 bytes
5	**St_Vect_Y_Vel** Vy component of sat. velocity	xs:double 8 bytes
6	**St_Vect_Z_Vel** Vz component of sat. velocity	xs:double 8 bytes
7	**AscNodeUTC** UTC epoch of sat. position	xs:string 25characters
8	**ReferenceUTC** UTC reference time	xs:string 25characters
9	**Filler** Padding for structure alignment	xs:hexBinary 2bytes
10	**SatBinTime** Satellite reference binary time	xs:unsignedLong 4 bytes
11	**ClockStepLength** Satellite reference binary time	xs:long 4 bytes
12	**DBType** 0 = predicted, 1 = restituted	xs:integer 4 bytes

Table 7: Orbital_Data_Record_Type Specification

3.1.1.3. DTPassID

The DTPassID (Pass Identification Header) contains the information to unambiguously identify the imaging sequence contained in the product.

This record is divided into five logical sections:

- Mission and Instrument Identification
- Ground Stations and Transcription System Identification
- Transcription Identification

- Orbit and Acquisition Identification
- Pointers to Tape Data Structure

The next figure provides a high level overview of the complex structures used to represent the information of the DTPassID file:

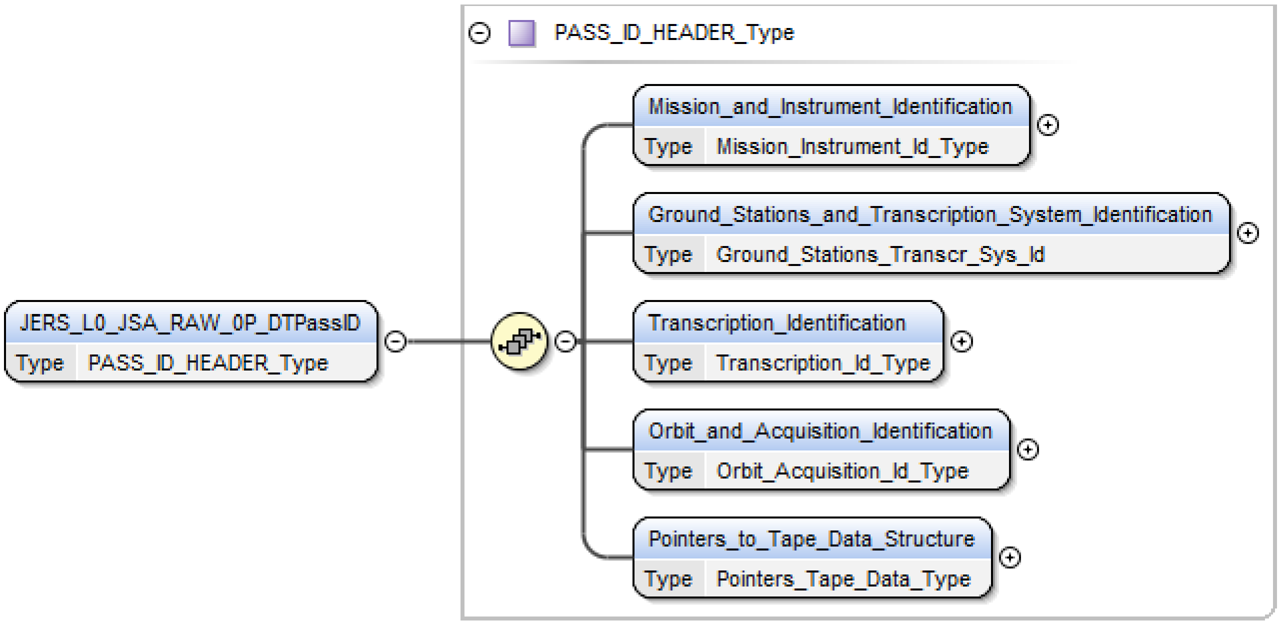

Figure 3: DFDL schema organisation for JSA_RAW_0P product - DTPassID

3.1.1.3.1. Root Element

#	Name/Description	Format
1	PASS IDENTIFICATION HEADER file The "Pass Identification Header" is the first file of the Transcription Area. It contains the information, available at the beginning of the transcription, to unambiguously identify the imaging sequence contained in the file. This record is divided into five logical sections: 1. Mission and Instrument Identification 2. Ground Stations and Transcription System Identification 3. Transcription Identification 4. Orbit and Acquisition Identification 5. Pointers to Tape Data Structure	PASS_ID_HEADER_Type

Table 8: JERS_L0_JSA_RAW_0P_DTPassID Specification

3.1.1.3.2. Complex Types

3.1.1.3.2.1.PASS_ID_HEADER_Type

#	Name/Description	Format
1	**Mission_and_Instrument_Identification**	Mission_Instrument_Id_Type

#	Name/Description	Format
2	**Ground_Stations_and_Transcription_System_Identification**	Ground_Stations_Transcr_Sys_Id
3	**Transcription_Identification**	Transcription_Id_Type
4	**Orbit_and_Acquisition_Identification**	Orbit_Acquisition_Id_Type
5	**Pointers_to_Tape_Data_Structure**	Pointers_Tape_Data_Type

Table 9: PASS_ID_HEADER_Type Specification

3.1.1.3.2.2.Mission_Instrument_Id_Type

Mission and Instrument Identification

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:hexBinary 76bytes
2	**Satellite_ID** Satellite Code: 1 - LANDSAT 2 - MOS 3 - J-ERS 4 - SPOT 5 - ERS 6 - IRS-C 7 - RADARSAT 8 - NOAA 9 - RESERVED 10 - RESERVED 11 - HELIOS 12 - SHUTTLE 13 - EOSAM 14 - EOSPM	xs:unsignedShort 2 bytes
3	**Mission_ID** Satellite Mission Number	xs:unsignedShort 2 bytes
4	**Instr_Type_ID** Satellite Mission Number: 1 - LANDSAT MSS 2 - LANDSAT TM 3 - LANDSAT ETM 4 - LANDSAT RBV 5 - MOS MESSR 6 - J-ERS VNIR 7 - J-ERS SWIR 8 - Not Used 9 - Not Used 10 - ERS AMI SAR 11 - ERS ATSR 12 - SPOT HRV 13 - J-ERS SAR 14 - NOAA AVHRR	xs:unsignedShort 2 bytes

#	Name/Description	Format
	15 - SPOT HRVIR 16 - SHUTTLE XSAR 17 - MODIS	
5	**Reserved_2** Reserved	xs:unsignedShort Min Occurs: 2 Max Occurs: 2 2 bytes

Table 10: Mission_Instrument_Id_Type Specification

3.1.1.3.2.3.Ground_Stations_Transcr_Sys_Id

Ground Stations and Transcription System Identification

#	Name/Description	Format
1	**Station_ID** Acquisition Ground Station Code: 67 - Adelaide 97 - Agrhymet 10 - AliceSpring 68 - Aspendale 105 - Atlanta 20 - Aussaguel 6 - Bangkok 52 - BantonRouge 49 - Bedford 74 - Beijing 30 - Berlin 31 - Berne 112 - Bishkek 29 - Bremenhaven 28 - Budapest 96 - Cairo 92 - Casey 64 - Cashoiera 32 - Copenhagen 103 - Cordoba 8 - Cotopaxi 23 - Cuiaba 76 - Da-Xing 33 - DeBilt 75 - Dhaka 50 - Downsview 34 - Dundee 51 - Edmonton 7 - Fairbanks 24 - Farnborough 35 - Frascati 1 - Fucino 65 - Funceme	xs:short 2 bytes

#	Name/Description	Format
	9 - Gatineau 54 - GilmoreCreek 36 - Hamburg 19 - HarteBeesHoek 16 - Hatoyama 37 - Helsinki 22 - Hobart 69 - Honolulu 11 - Hyderabad 21 - Islamabad 115 - Itu 77 - Keelung 116 - KhantyMansiysk 2 - Kiruna 78 - Kiyose 113 - Kitab 111 - Kourou 38 - Krakow 91 - KualaLumpur 12 - Kumamoto 39 - Lannion 79 - Lapan 99 - LaReunion 40 - Lasham 106 - Libreville 41 - Madrid 109 - Malindi 80 - Manila 3 - Maspalomas 104 - Matera 93 - McMurdo 53 - Miami 110 - Moscow 98 - Nairobi 55 - NESDIS 108 - Neustrelitz 81 - NewDelhi 102 - Norman 42 - Norrkoping 27 - Oberpfaff 43 - Offenbach 15 - OHiggins 44 - Oslo 94 - Palmer 18 - PariPari 70 - Perth 45 - Prague 25 - Pretoria 13 - PrinceAlbert 57 - RedwoodCity	

#	Name/Description	Format
	82 - Riyadh 46 - Rome 101 - RRSC_Nairobi 66 - Santiago 26 - Scanzano 58 - Scipps Inst 84 - Selangor 87 - Sendai 85 - Seoul 86 - SeoulUniv 83 - Singapore 59 - SiouxFalls 47 - Spitzenbergen 60 - StennisSpace 71 - Sydney 17 - Syowa 90 - Taipei 5 - Tel_Aviv 95 - TerranovaBay 88 - TokaiUniv 89 - TokyoUniv 72 - Townsville 48 - Traben-Trar 4 - Tromso 100 - Tunis 114 - UlanBator 61 - UnivOfAlaska 63 - UnivOfRhodeIsl 62 - UnivOfTexas 56 - WallopsIsl 73 - Wellington 14 - WestFreugh	
2	**Station_DT_ID** Data Transcription Ground Station Code	xs:short 2 bytes
3	**Filler** Padding for stucture alignment	xs:hexBinary 2bytes

Table 11: Ground_Stations_Transcr_Sys_Id Specification

3.1.1.3.2.4.Transcription_Id_Type

Transcription Identification

#	Name/Description	Format
1	**Source_Type** Data Source Type: 1 - AMPEX 14 tracks 2 - Shlumberger 14 tracks 3 - Shlumberger 42 tracks 4 - Penny and Giles	xs:unsignedInt 4 bytes

#	Name/Description	Format
	5 - Honeywell HD-96 6 - AMPEX DCRSi 7 - CREO Optical Tape 8 - Direct Ingestion 9 - SONY DIR 1000 (R)	
2	**Format_SyncType** Format Synchroniser/Decommutator Code: 1 - MCS ERS FS 2 - SPACETEC ERS HR FS 3 - IAI ERS HR FS 4 - LABEN ERS HR FS 5 - SPACETEC/ACS ERS FS 6 - ENERTEC MSS FS 7 - ENERTEC TM FS 8 - ACS SW FORMAT SYNCH 14 - ACS XSAR FORMAT SW SYNCH	xs:unsignedInt 4 bytes
3	**Reserved** Reserved	xs:unsignedInt Min Occurs: 2 Max Occurs: 2 4 bytes

Table 12: Transcription_Id_Type Specification

3.1.1.3.2.5.Orbit_Acquisition_Id_Type

Orbit and Acquisition Identification

#	Name/Description	Format
1	**Track_Number** Track or Data Take Number (when applicable)	xs:integer 4 bytes
2	**Orbit** Orbit number (when applicable)	xs:integer 4 bytes
3	**Reserved_1** Reserved	xs:integer Min Occurs: 9 Max Occurs: 9 4 bytes
4	**Reserved_2** Reserved	xs:short Min Occurs: 3 Max Occurs: 3 2 bytes
5	**Reserved_3** Reserved	xs:hexBinary 18bytes
6	**Transcription_Date** Transcription Date in D M Y (WARNING: Year could be expressed in some tapes as years from 1900)	xs:short Min Occurs: 3 Max Occurs: 3 2 bytes
7	**Reserved_4** Reserved	xs:short Min Occurs: 6 Max Occurs: 6 2 bytes

#	Name/Description	Format
8	**Filler** Padding for stucture alignment	xs:hexBinary 2bytes

Table 13: Orbit_Acquisition_Id_Type Specification

3.1.1.3.2.6.Pointers_Tape_Data_Type

Pointers to Tape Data Structure

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:integer Min Occurs: 5 Max Occurs: 5 4 bytes
2	**Physical_Address_1** User Header Address. File Number of the User Header. It is the number of files, numbered from DLT start, preceding the User Header file in current Transcription Area.	xs:long 4 bytes
3	**Physical_Address_2** Pass Id. Header Address. File Number of the Pass Id. Header. It is the number of files, numbered from DLT start, preceding the Pass Id. Header file in current Transcription Area.	xs:long 4 bytes
4	**Reserved_2** Reserved	xs:hexBinary 652bytes

Table 14: Pointers_Tape_Data_Type Specification

3.1.1.4. DTSegment

This DTSegment file contains the descriptions of all the segments in which the satellite pass has been divided.

The next figure provides a high level overview of the complex structures used to represent the information of the DTSegment file:

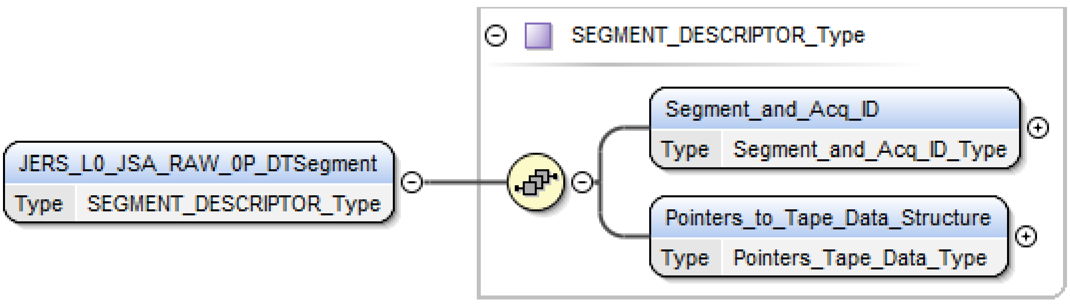

Figure 4: DFDL schema organisation for JSA_RAW_0P product - DTSegment

3.1.1.4.1. Root Element

#	Name/Description	Format
1	SEGMENT DESCRIPTOR file This file contains the descriptions of all the segments in which the satellite pass has been divided. Each segment is described by one structure. The "Segment Descriptor Structure" is thus repeated as many times as the number of segments recorded in the "Sensor Acquired Data" file. Each segment is completely described by the following fields and contains all information to address it within the video data records. The number of items and the length are specified into the "User Header file - Pointer to Tape Data Structure Description Section" (described in previous paragraph).	SEGMENT_DESCRIPTOR_Type

Table 15: JERS_L0_JSA_RAW_0P_DTSegment Specification

3.1.1.4.2. Complex Types

3.1.1.4.2.1.SEGMENT_DESCRIPTOR_Type

#	Name/Description	Format
1	**Segment_and_Acq_ID**	Segment_and_Acq_ID_Type
2	**Pointers_to_Tape_Data_Structure**	Pointers_Tape_Data_Type

Table 16: SEGMENT_DESCRIPTOR_Type Specification

3.1.1.4.2.2.Segment_and_Acq_ID_Type

Segment and Acquisition Identification

#	Name/Description	Format
1	**Acquis_Date_Year** Acquisition Date of the Sat. Pass (Year)	xs:short 2 bytes
2	**Acquis_Date_Month** Acquisition Date of the Sat. Pass (Month)	xs:short 2 bytes
3	**Acquis_Date_Day** Acquisition Date of the Sat. Pass (Day)	xs:short 2 bytes
4	**Acquis_Day** Day in the year of the acquisition	xs:short 2 bytes
5	**Segment_Start_Hours** Start of Segment (Hours)	xs:short 2 bytes
6	**Segment_Start_Min**	xs:short

#	Name/Description	Format
	Start of Segment (Min)	2 bytes
7	**Segment_Start_Sec** Start of Segment (Sec)	xs:short 2 bytes
8	**Segment_Start_Millisec** Start of Segment (Millisec)	xs:short 2 bytes
9	**Segment_End_Hours** End of Segment (Hours)	xs:short 2 bytes
10	**Segment_End_Min** End of Segment (Min)	xs:short 2 bytes
11	**Segment_End_Sec** End of Segment (Sec)	xs:short 2 bytes
12	**Segment_End_Millisec** End of Segment (Millisec)	xs:short 2 bytes
13	**Loaded_Swath** Nr. of lines loaded on tape for this segment	xs:integer 4 bytes
14	**First_Swath** First swath of the segment	xs:integer 4 bytes
15	**Last_Swath** Last swath of the segment	xs:integer 4 bytes
16	**Lost_Swath** Lost swaths of the segment	xs:integer 4 bytes
17	**First_Frame** First frame of the segment (when applicable)	xs:integer 4 bytes
18	**Last_Frame** Last frame of the segment (when applicable)	xs:integer 4 bytes
19	**First_OBC** First On Board Counter or TSID (when applicable)	xs:integer 4 bytes
20	**Last_OBC** Last On Board Counter or TSID (when applicable)	xs:integer 4 bytes

Table 17: Segment_and_Acq_ID_Type Specification

3.1.1.4.2.3.Pointers_Tape_Data_Type

Pointers to Tape Data Structure

#	Name/Description	Format
1	**Starting_Address** Pass Id. Header file Address	xs:long 4 bytes
2	**Swath_Size** Swath length (in bytes) This field is filled only if its value changed between different Segments. If it does not change the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	xs:integer 4 bytes
3	**Swath_per_Block** Number of swaths per block This field is filled only if its value changed between different Segments. If it does not change	xs:integer 4 bytes

#	Name/Description	Format
	the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	
4	**Nr_of_Blocks** Number of blocks This field is filled only if its value changed between different Segments. If it does not change the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	xs:integer 4 bytes
5	**Formats_Per_Swath** Number of formats per swath This field is filled only if its value changed between different Segments. If it does not change the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	xs:integer 4 bytes
6	**Filler** Filler	xs:hexBinary 52bytes

Table 18: Pointers_Tape_Data_Type Specification

3.1.1.5. DTStatisticFile

The Statistics file constitutes a sort of summary of all transcribed passes.

The next figure provides a high level overview of the complex structures used to represent the information of the DTStatisticFile:

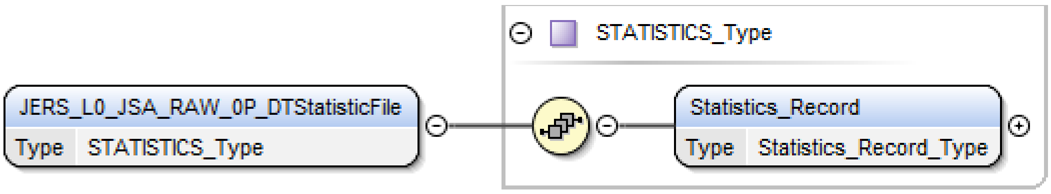

Figure 5: DFDL schema organisation for JSA_RAW_0P product - DTStatisticFile

3.1.1.5.1. Root Element

#	Name/Description	Format
1	STATISTICS file The Statistics file always follows the Transcription Area in the DLT and constitutes a sort of summary of the passes contained in the DLT. The Statistics File following the last Transcription Area of the cassette constitutes a directory, with information on all the transcribed passes. This structure allows an easy positioning of the tape on the requested pass. To achieve this goal, when the tape inspection is performed, the end of	STATISTICS_Type

#	Name/Description	Format
	tape is reached without reading any data. Then the control jumps one file back (at the beginning of the last Statistics file). Reading this file the content of the whole DLT can be known. The first record is empty. The successive records are structured according the table below; each of them points to the successive Transcription Area stored on the cassette.	

Table 19: JERS_L0_JSA_RAW_0P_DTStatisticFile Specification

3.1.1.5.2. Complex Types

3.1.1.5.2.1.STATISTICS_Type

#	Name/Description	Format
1	**Statistics_Record**	Statistics_Record_Type

Table 20: STATISTICS_Type Specification

3.1.1.5.2.2.Statistics_Record_Type

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:hexBinary 4bytes
2	**Satellite_ID** Satellite Code	xs:unsignedShort 2 bytes
3	**Mission_ID** Mission. Number	xs:unsignedShort 2 bytes
4	**Instr_Type_ID** Instrument Type Code	xs:unsignedShort 2 bytes
5	**Reserved_2** Reserved	xs:unsignedShort Min Occurs: 2 Max Occurs: 2 2 bytes
6	**Station_ID** Acquisition Ground Station Code	xs:unsignedShort 2 bytes
7	**Reserved_3** Reserved	xs:short 2 bytes
8	**Filler** Padding for structure alignment	xs:hexBinary 2bytes
9	**Track_Number** Track Number (when applicable)	xs:integer 4 bytes
10	**Orbit_Number** Orbit number (when applicable)	xs:integer 4 bytes
11	**Reserved_4** Reserved	xs:integer 4 bytes
12	**Number_of_Frames** Number of standard frames (when applicable)	xs:integer 4 bytes

#	Name/Description	Format
13	**First_Frame** Num of first standard frame (when applicable)	xs:integer 4 bytes
14	**Reserved_5** Reserved	xs:integer Min Occurs: 4 Max Occurs: 4 4 bytes
15	**Acquisition_Date_Year** Acquisition Date (Year)	xs:short 2 bytes
16	**Acquisition_Date_Month** Acquisition Date (Month)	xs:short 2 bytes
17	**Acquisition_Date_Day** Acquisition Date (Month)	xs:short 2 bytes
18	**Acquisition_Day** Acquisition Day of the year	xs:short 2 bytes
19	**Acquisition_Start_Hours** Start of acquisition (Hours)	xs:short 2 bytes
20	**Acquisition_Start_Min** Start of acquisition (Min)	xs:short 2 bytes
21	**Acquisition_Start_Sec** Start of acquisition (Sec)	xs:short 2 bytes
22	**Acquisition_Start_Millisec** Start of acquisition (Millisec)	xs:short 2 bytes
23	**Acquisition_End_Hours** End of acquisition (Hours)	xs:short 2 bytes
24	**Acquisition_End_Min** End of acquisition (Min)	xs:short 2 bytes
25	**Acquisition_End_Sec** End of acquisition (Sec)	xs:short 2 bytes
26	**Acquisition_End_Millisec** End of acquisition (Millisec)	xs:short 2 bytes
27	**Transcription_Date_Day** Transcription Date (Day)	xs:short 2 bytes
28	**Transcription_Date_Month** Transcription Date (Month)	xs:short 2 bytes
29	**Transcription_Date_Year** Transcription Date (Year)(WARNING: Year could be expressed in some tapes as years from 1900)	xs:short 2 bytes
30	**Reserved_6** Reserved	xs:short Min Occurs: 6 Max Occurs: 6 2 bytes
31	**Filler** Padding for structure alignment	xs:hexBinary 2bytes
32	**Reserved_7** Reserved	xs:integer Min Occurs: 10 Max Occurs: 10 4 bytes
33	**Physical_Address_1** User Header file number	xs:long 4 bytes

#	Name/Description	Format
34	**Physical_Address_2** Pass Id. Header file number	xs:long 4 bytes
35	**Reserved_8** Reserved	xs:hexBinary 697bytes
36	**Copy_Date_Day** Date when this record has been generated as a copy from another tape (Day)	xs:unsignedByte 1bytes
37	**Copy_Date_Month** Date when this record has been generated as a copy from another tape (Month)	xs:unsignedByte 1bytes
38	**Copy_Date_Year** Date when this record has been generated as a copy from another tape (Year)	xs:unsignedByte 1bytes
39	**Copy_Source_Tape_Number** Number of the source tape from where this record was generated	xs:long 4 bytes
40	**Copy_Flag** 1 = this is a copied record 0 = this is the original transcribed record	xs:unsignedByte 1bytes
41	**Copy_Source_Media_Type** 4 = DLT 2 = SONY ID1	xs:unsignedByte 1bytes
42	**Reserved_9** Reserved	xs:hexBinary 2bytes

Table 21: Statistics_Record_Type Specification

3.1.1.6. DTTelemetry

Data is formatted in Minor Frames and a header (which reports information about the data continuity).

PCM Minor Frames are formatted at a rate of two per second. Up to about 1500 logical records can so be found in a “Payload Correction” file (for 12 minutes of maximum pass duration). However, records number and length of present file must be read from “User Header” file at section “Pointers to Tape Data Structure”, where detailed description of files following the “User Header” is reported.

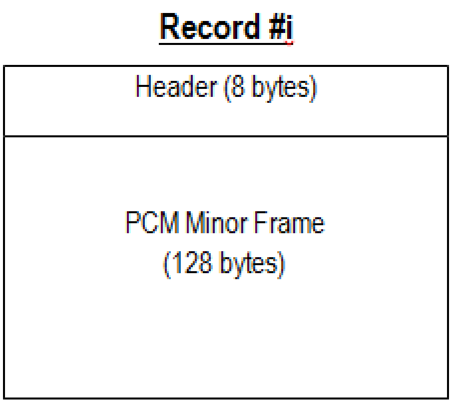

Figure 6: DTTelemetry organisation – JERS-SAR

The next figure provides a high level overview of the complex structures used to represent the information of the DTSegment file:

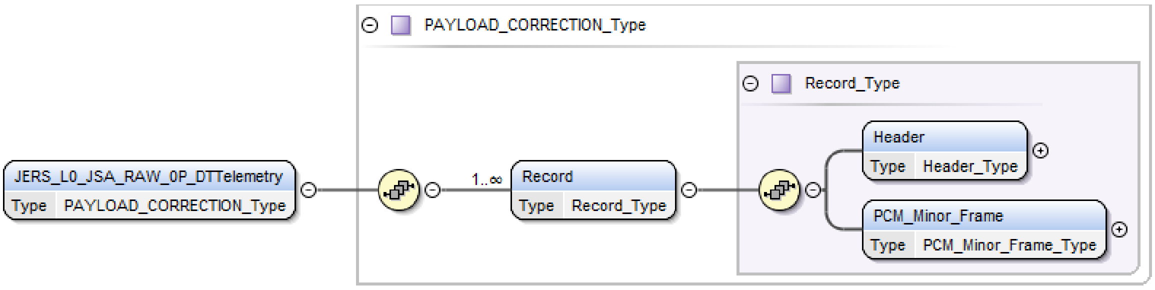

Figure 7: DFDL schema organisation for JSA_RAW_0P product - DTTelemetry

3.1.1.6.1. Root Element

#	Name/Description	Format
1	PAYLOAD CORRECTION file "Payload Correction" file is reported here for JERS SAR transcriptions. In this case, PCM data are extracted and transcribed onto DLT tape in a separate file. Of course, they are still present multiplexed in data lines. These data are transcribed in their emission form, as before multiplexing procedure. They are synchronised and formatted in Minor Frames and an header is added to form a record as follows. PCM Minor Frames are formatted at a rate of two per second. Up to about 1500 logical records can so be found in a "Payload Correction" file (for 12 minutes of maximum pass duration). However, records number and length of present file must be read from "User Header" file at section "Pointers to Tape Data Structure", where detailed description of files following the "User Header" is reported.	PAYLOAD_CORRECTION_Type

Table 22: JERS_L0_JSA_RAW_0P_DTSegment Specification

3.1.1.6.2. Complex Types

3.1.1.6.2.1.PAYLOAD_CORRECTION_Type

#	Name/Description	Format
1	**Record**	Record_Type Max Occurs: unbounded

Table 23: PAYLOAD_CORRECTION_Type Specification

3.1.1.6.2.2.Record_Type

#	Name/Description	Format
1	**Header**	Header_Type
2	**PCM_Minor_Frame**	PCM_Minor_Frame_Type

Table 24: Record_Type Specification

3.1.1.6.2.3.Header_Type

The Header reports information about the data continuity.

#	Name/Description	Format
1	**Complete_Flag** If found: 0x00 = Complete Minor Frame 0xFF = Incomplete MF	xs:hexBinary 1 bytes
2	**Loss_Start** First byte of MF set to 0 (set if incomplete)	xs:hexBinary 1 bytes
3	**Lost_Lines** Number of lost lines in video data during extraction (set if incomplete)	xs:unsignedShort 2 bytes
4	**Line_Counter** Line Counter referred to video line containing first sync bit of present MF. Masked with 0x00FFFFFF	xs:integer 4 bytes

Table 25: Header_Type Specification

3.1.1.6.2.4.PCM_Minor_Frame_Type

PCM sample data are telemetry data that are the same as the CIDH telemetry data. Each PCM sample data consist of 2 telemetry bits and 1 clock bit. These 2 telemetry data are the same value. The sampling interval between the last sampling of the data format frame and the first sampling of the next frame changes according to the PRF.

#	Name/Description	Format
1	**Frame_Sync**	xs:hexBinary 3 bytes
2	**NASDA_Use**	xs:hexBinary 1 bytes
3	**Spare**	xs:hexBinary 1 bytes
4	**Frame_ID**	xs:hexBinary 1 bytes
5	**Spare**	xs:hexBinary 10 bytes
6	**Spacecraft_Time_Data**	xs:hexBinary 2 bytes

#	Name/Description	Format
7	**Spacecraft_ID**	xs:hexBinary 1 bytes
8	**Spare**	xs:hexBinary 33 bytes
9	**Subcommutation**	xs:hexBinary 1 bytes
10	**Spare**	xs:hexBinary 15 bytes
11	**AOCS_Data**	xs:hexBinary 12 bytes
12	**Spare**	xs:hexBinary 12 bytes
13	**SAR_Telemetry**	SAR_Telemetry_Type
14	**OPS_Telemetry**	OPS_Telemetry_Type
15	**Spare**	xs:hexBinary 12 bytes

Table 26: PCM_Minor_Frame_Type Specification

3.1.1.6.2.5.SAR_Telemetry_Type

#	Name/Description	Format
1	**SAR_RF_Output_Level_A**	xs:hexBinary 1 bytes
2	**SAR_CAL_Output_Level_A**	xs:hexBinary 1 bytes
3	**SAR_I-Channel_Video_Signal_Level_A**	xs:hexBinary 1 bytes
4	**SAR_Q-Channel_Video_Signal_Level_A**	xs:hexBinary 1 bytes
5	**SAR_RF_Output_Level_B**	xs:hexBinary 1 bytes
6	**SAR_CAL_Output_Level_B**	xs:hexBinary 1 bytes
7	**SAR_I-Channel_Video_Signal_Level_B**	xs:hexBinary 1 bytes
8	**SAR_Q-Channel_Video_Signal_Level_B**	xs:hexBinary 1 bytes
9	**SAR_Serial_Digital_TLM_1**	xs:hexBinary 1 bytes
10	**SAR_2**	xs:hexBinary 1 bytes
11	**SAR_3**	xs:hexBinary 1 bytes
12	**SAR_4**	xs:hexBinary 1 bytes
13	**SAR_5**	xs:hexBinary 1 bytes
14	**SAR_6**	xs:hexBinary

#	Name/Description	Format
		1 bytes
15	**SAR_7**	xs:hexBinary 1 bytes
16	**SAR_8**	xs:hexBinary 1 bytes

Table 27: SAR_Telemetry_Type Specification

3.1.1.6.2.6.OPS_Telemetry_Type

#	Name/Description	Format
1	**OPS**	xs:hexBinary 1 bytes
2	**OPS**	xs:hexBinary 1 bytes
3	**OPS**	xs:hexBinary 1 bytes
4	**OPS**	xs:hexBinary 1 bytes
5	**OPS**	xs:hexBinary 1 bytes
6	**OPS**	xs:hexBinary 1 bytes
7	**Spare**	xs:hexBinary 1 bytes
8	**OPS**	xs:hexBinary 1 bytes

Table 28: OPS_Telemetry_Type Specification

3.1.1.7. DTUserHeader

The DTUserHeader file contains the acquisition description as well as the logical and physical file structure. It contains all the parameters of the imaging sequence, the orbital parameters, the information about acquisition station, the description of the file structure and contents and all information necessary for further processing. It has the same structure for all satellites transcriptions.

The next figure provides a high level overview of the complex structures used to represent the information of the DTUserHeader file:

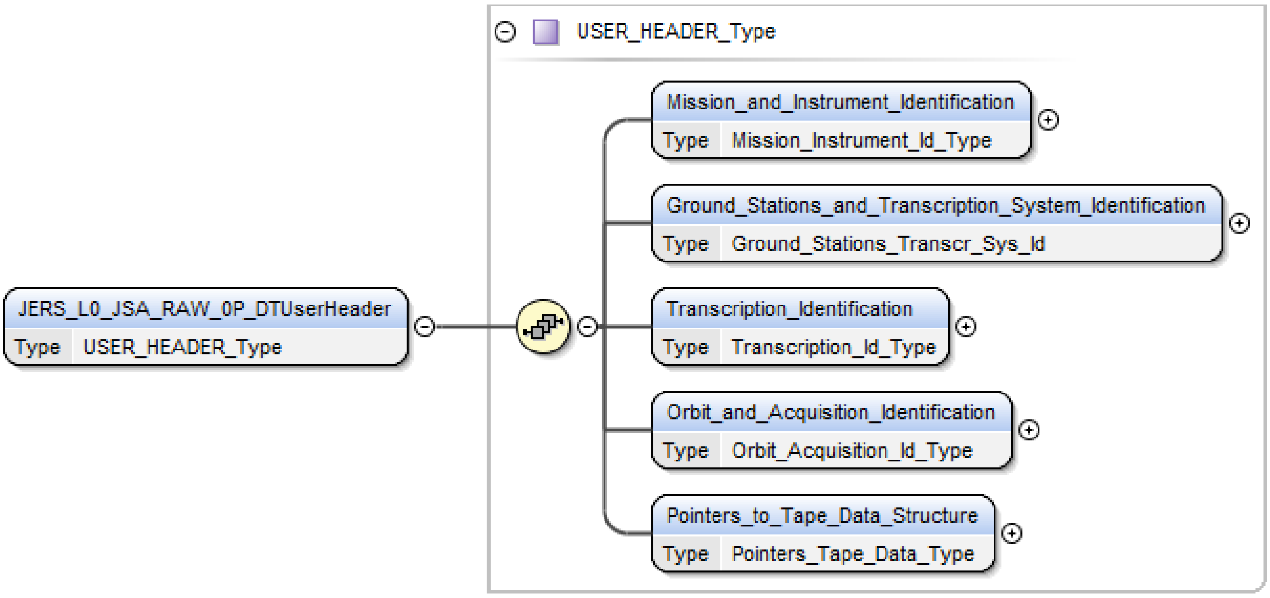

Figure 8: DFDL schema organisation for JSA_RAW_0P product - DTUserHeader

3.1.1.7.1. Root Element

#	Name/Description	Format
1	USER HEADER file The "User Header" file contains the acquisition description as well as the logical and physical file structure. The file is divided into five logical sections: 1. Mission and Instrument Identification 2. Ground Stations and Transcription System Identification 3. Transcription Identification 4. Orbit and Acquisition Identification 5. Pointers to Tape Data Structure	USER_HEADER_Type

Table 29: JERS_L0_JSA_RAW_0P_DTUserHeader Specification

3.1.1.7.2. Complex Types

3.1.1.7.2.1. USER_HEADER_Type

#	Name/Description	Format
1	**Mission_and_Instrument_Identification**	Mission_Instrument_Id_Type
2	**Ground_Stations_and_Transcription_System_Identification**	Ground_Stations_Transcr_Sys_Id
3	**Transcription_Identification**	Transcription_Id_Type
4	**Orbit_and_Acquisition_Identification**	Orbit_Acquisition_Id_Type
5	**Pointers_to_Tape_Data_Structure**	Pointers_Tape_Data_Type

Table 30: USER_HEADER_Type Specification

3.1.1.7.2.2.Mission_Instrument_Id_Type

Mission and Instrument Identification

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:hexBinary 76 bytes
2	**Satellite_ID** Satellite Code: 1 - LANDSAT 2 - MOS 3 - J-ERS 4 - SPOT 5 - ERS 6 - IRS-C 7 - RADARSAT 8 - NOAA 9 - RESERVED 10 - RESERVED 11 - HELIOS 12 - SHUTTLE 13 - EOSAM 14 - EOSPM	xs:short 2 bytes
3	**Mission_ID** Satellite Mission Number	xs:short 2 bytes
4	**Instr_Type_ID** Satellite Mission Number: 1 - LANDSAT MSS 2 - LANDSAT TM 3 - LANDSAT ETM 4 - LANDSAT RBV 5 - MOS MESSR 6 - J-ERS VNIR 7 - J-ERS SWIR 8 - Not Used 9 - Not Used 10 - ERS AMI SAR 11 - ERS ATSR 12 - SPOT HRV 13 - J-ERS SAR 14 - NOAA AVHRR 15 - SPOT HRVIR 16 - SHUTTLE XSAR 17 - MODIS	xs:short 2 bytes
5	**Instr_Number** Instrument number (when applicable)	xs:short 2 bytes
6	**Transm_Channel** Instrument number (when applicable)	xs:short 2 bytes

Table 31: Mission_Instrument_Id_Type Specification

3.1.1.7.2.3.Ground_Stations_Transcr_Sys_Id

Ground Stations and Transcription System Identification

#	Name/Description	Format
1	**Station_ID** Acquisition Ground Station Code: 67 - Adelaide 97 - Agrhymet 10 - AliceSpring 68 - Aspendale 105 - Atlanta 20 - Aussaguel 6 - Bangkok 52 - BantonRouge 49 - Bedford 74 - Beijing 30 - Berlin 31 - Berne 112 - Bishkek 29 - Bremenhaven 28 - Budapest 96 - Cairo 92 - Casey 64 - Cashoiera 32 - Copenhagen 103 - Cordoba 8 - Cotopaxi 23 - Cuiaba 76 - Da-Xing 33 - DeBilt 75 - Dhaka 50 - Downsview 34 - Dundee 51 - Edmonton 7 - Fairbanks 24 - Farnborough 35 - Frascati 1 - Fucino 65 - Funceme 9 - Gatineau 54 - GilmoreCreek 36 - Hamburg 19 - HarteBeesHoek 16 - Hatoyama 37 - Helsinki 22 - Hobart 69 - Honolulu 11 - Hyderabad	xs:short 2 bytes

#	Name/Description	Format
	21 - Islamabad 115 - Itu 77 - Keelung 116 - KhantyMansiysk 2 - Kiruna 78 - Kiyose 113 - Kitab 111 - Kourou 38 - Krakow 91 - KualaLumpur 12 - Kumamoto 39 - Lannion 79 - Lapan 99 - LaReunion 40 - Lasham 106 - Libreville 41 - Madrid 109 - Malindi 80 - Manila 3 - Maspalomas 104 - Matera 93 - McMurdo 53 - Miami 110 - Moscow 98 - Nairobi 55 - NESDIS 108 - Neustrelitz 81 - NewDelhi 102 - Norman 42 - Norrkoping 27 - Oberpfaff 43 - Offenbach 15 - OHiggins 44 - Oslo 94 - Palmer 18 - PariPari 70 - Perth 45 - Prague 25 - Pretoria 13 - PrinceAlbert 57 - RedwoodCity 82 - Riyadh 46 - Rome 101 - RRSC_Nairobi 66 - Santiago 26 - Scanzano 58 - Scipps Inst 84 - Selangor 87 - Sendai 85 - Seoul	

#	Name/Description	Format
	86 - SeoulUniv 83 - Singapore 59 - SiouxFalls 47 - Spitzenbergen 60 - StennisSpace 71 - Sydney 17 - Syowa 90 - Taipei 5 - Tel_Aviv 95 - TerranovaBay 88 - TokaiUniv 89 - TokyoUniv 72 - Townsville 48 - Traben-Trar 4 - Tromso 100 - Tunis 114 - UlanBator 61 - UnivOfAlaska 63 - UnivOfRhodeIsl 62 - UnivOfTexas 56 - WallopsIsl 73 - Wellington 14 - WestFreugh	
2	**Station_DT_ID** Data Transcription Ground Station Code	xs:short 2 bytes
3	**Filler** Padding for stucture alignment	xs:hexBinary 2 bytes

Table 32: Ground_Stations_Transcr_Sys_Id Specification

3.1.1.7.2.4.Transcription_Id_Type

Transcription Identification

#	Name/Description	Format
1	**Input_HddrType** HDDR Code	xs:unsignedInt 4 bytes
2	**Format_SyncType** Format Synchroniser/Decommutator Code: 1 - MCS ERS FS 2 - SPACETEC ERS HR FS 3 - IAI ERS HR FS 4 - LABEN ERS HR FS 5 - SPACETEC/ACS ERS FS 6 - ENERTEC MSS FS 7 - ENERTEC TM FS 8 - ACS SW FORMAT SYNCH 14 - ACS XSAR FORMAT SW SYNCH	xs:unsignedInt 4 bytes
3	**Reserved** Reserved	xs:unsignedInt Min Occurs: 2

#	Name/Description	Format
		Max Occurs: 2 4 bytes

Table 33: Transcription_Id_Type Specification

3.1.1.7.2.5.Orbit_Acquisition_Id_Type

Orbit and Acquisition Identification

#	Name/Description	Format
1	**Track_Number** Track or Data Take Number (when applicable)	xs:integer 4 bytes
2	**Orbit_Number** Orbit number (when applicable)	xs:integer 4 bytes
3	**Cycle_Number** Cycle number (when applicable)	xs:integer 4 bytes
4	**Numb_of_Frames** Number of standard frames (when applicable)	xs:integer 4 bytes
5	**First_Frame** Num. of first standard frame (when applicable)	xs:integer 4 bytes
6	**Reserved** Reserved	xs:unsignedInt Min Occurs: 4 Max Occurs: 4 4 bytes
7	**First_OBC** 1st On Board Counter (when applicable)	xs:unsignedInt 4 bytes
8	**Last_OBC** Last On Board Counter (when applicable)	xs:unsignedInt 4 bytes
9	**Acquis_Date_Year** Acquisition Date (Year)	xs:unsignedShort 2 bytes
10	**Acquis_Date_Month** Acquisition Date (Month)	xs:unsignedShort 2 bytes
11	**Acquis_Date_Day** Acquisition Date (Day)	xs:unsignedShort 2 bytes
12	**Acquis_Day** Day in the year of the acquisition	xs:unsignedShort 2 bytes
13	**Acquis_start_Hour** Start of acquisition (Hour)	xs:unsignedShort 2 bytes
14	**Acquis_start_Min** Start of acquisition (Minutes)	xs:unsignedShort 2 bytes
15	**Acquis_start_Sec** Start of acquisition (Seconds)	xs:unsignedShort 2 bytes
16	**Acquis_start_Millisec** Start of acquisition (Milliseconds)	xs:unsignedShort 2 bytes
17	**Acquis_end_Hour** End of acquisition (Hours)	xs:unsignedShort 2 bytes
18	**Acquis_end_Min** End of acquisition (Minutes)	xs:unsignedShort 2 bytes
19	**Acquis_end_Sec**	xs:unsignedShort

#	Name/Description	Format
	End of acquisition (Seconds)	2 bytes
20	**Acquis_end_Millisec** End of acquisition (Milliseconds)	xs:unsignedShort 2 bytes
21	**Transcription_Date_Day** Transcription Date in Days	xs:unsignedShort 2 bytes
22	**Transcription_Date_Month** Transcription Date in Months	xs:unsignedShort 2 bytes
23	**Transcription_Date_Year** Transcription Date in Years (WARNING: Year could be expressed in some tapes as years from 1900)	xs:unsignedShort 2 bytes
24	**Transcription_Start_Hour** Transcription start in Hours	xs:unsignedShort 2 bytes
25	**Transcription_Start_Min** Transcription start in Minutes	xs:unsignedShort 2 bytes
26	**Transcription_Start_Sec** Transcription start in Seconds	xs:unsignedShort 2 bytes
27	**Transcription_End_Hour** Transcription end in Hours	xs:unsignedShort 2 bytes
28	**Transcription_End_Min** Transcription end in Minutes	xs:unsignedShort 2 bytes
29	**Transcription_End_Sec** Transcription end in Seconds	xs:unsignedShort 2 bytes
30	**Filler** Padding for stucture alignment	xs:hexBinary 2 bytes

Table 34: Orbit_Acquisition_Id_Type Specification

3.1.1.7.2.6.Pointers_Tape_Data_Type

This structure is meaningful only in the "User Header" file (it is empty in "Pass Id. Header"). The last field of the first area (Nr_of_Files) indicates how many files follow the "User Header" inside the same Transcription Area (same passage).
This number has been taken as a parameter to allow the maximum flexibility. In the Transcription Systems presently designed and installed the parameter "Nr_of_Files" can be 4 for JERS SAR.

The 10 blocks which follow "Nr_of Files" describes the files following the "User Header" in current "Transcription Area". Each of these blocks describes one file. The number of blocks actually filled is thus equal to "Nr_of_Files"

In JERS case there are 4 blocks filled, which correspond respectively to:
1. The "Segment Descriptor" file,
2. The "Orbit Data" file,
3. The "Payload Correction" file,
4. The "Block Addresses Descriptor" file.

#	Name/Description	Format
1	**Num_of_segments** Number of segments (when applicable)	xs:integer 4 bytes
2	**Loaded_Swath**	xs:integer

#	Name/Description	Format
	Number of transcribed swaths	4 bytes
3	**Swath_Size** Swath length (in bytes)	xs:integer 4 bytes
4	**Swath_per_Block** Number of swaths per block	xs:integer 4 bytes
5	**Nr_of_Blocks** Number of blocks	xs:integer 4 bytes
6	**Physical_Address_1** User Header Address. File Number of the User Header. It is the number of files, numbered from DLT start, preceding the User Header file in current Transcription Area.	xs:long 4 bytes
7	**Physical_Address_2** Pass Id. Header Address. File Number of the Pass Id. Header. It is the number of files, numbered from DLT start, preceding the Pass Id. Header file in current Transcription Area.	xs:long 4 bytes
8	**Nr_of_Files** Number of files following the present	xs:integer 4 bytes
9	**File**	Pointers_Tape_Data_File_Type Min Occurs: 10 Max Occurs: 10
10	**Reserved** Reserved	xs:hexBinary 8bytes

Table 35: Pointers_Tape_Data_Type Specification

3.1.1.7.2.7.Pointers_Tape_Data_File_Type

#	Name/Description	Format
1	**File_ID** File type identifier	xs:integer 4 bytes
2	**File_Num** Number of physical records	xs:integer 4 bytes
3	**Record_Length** Physical record length in bytes	xs:integer 4 bytes
4	**Elem_Num** Number of logical element per record	xs:integer 4 bytes
5	**Elem_Length** Logical element length in bytes	xs:integer 4 bytes
6	**Filler** Spare	xs:hexBinary 44 bytes

Table 36: Pointers_Tape_Data_File_Type Specification

3.1.1.8. DTVideoData

The JERS SAR Sensor Data are written on tape subdivided in Blocks having the same length to allow the pointing mechanism. Each block contains 325 lines (this number is specified by the "Swath per Block" element in the "User Header - Pointers to Tape Data Structure" file).

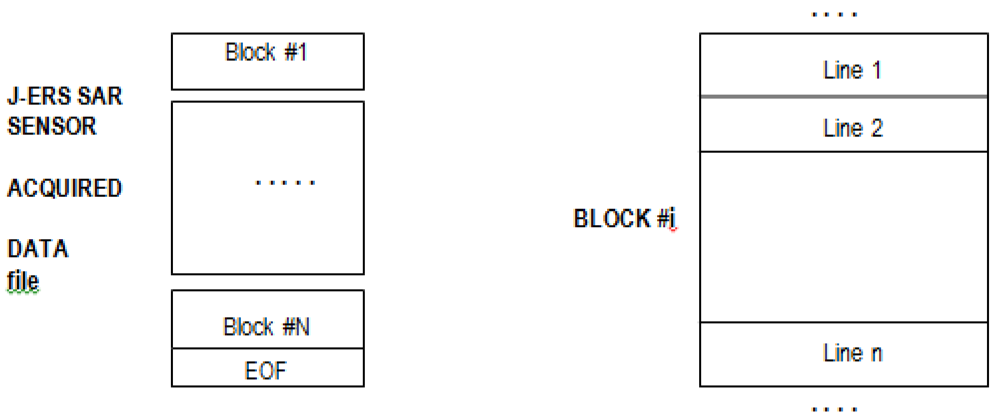

Figure 9: DTVideoData Block organisation – JERS-SAR

The JERS SAR Observation Data are transmitted as a series of frames. Each frame corresponds to one line of observed or calibration data. Two transmitted channels, named I and Q, have the same Line format and identical auxiliary data content: they differ only for the nature of observed data. In the transcribed data I and Q lines are interleaved each three bits words.

Some auxiliary information and line time are extracted and reported in a Line Header for faster processing procedure. The resulting Line is 6264 bytes long and has the following overall structure:

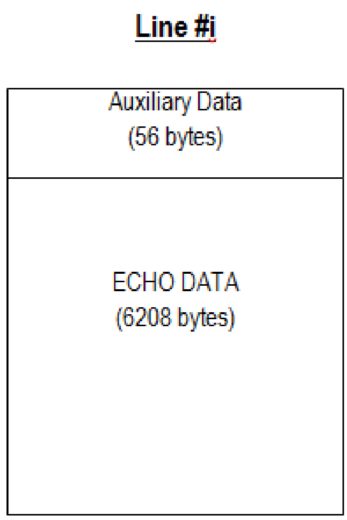

Figure 10: DTVideoData Line organisation - JERS-SAR

The next figure provides a high level overview of the complex structures used to represent the information of the DTVideoData file:

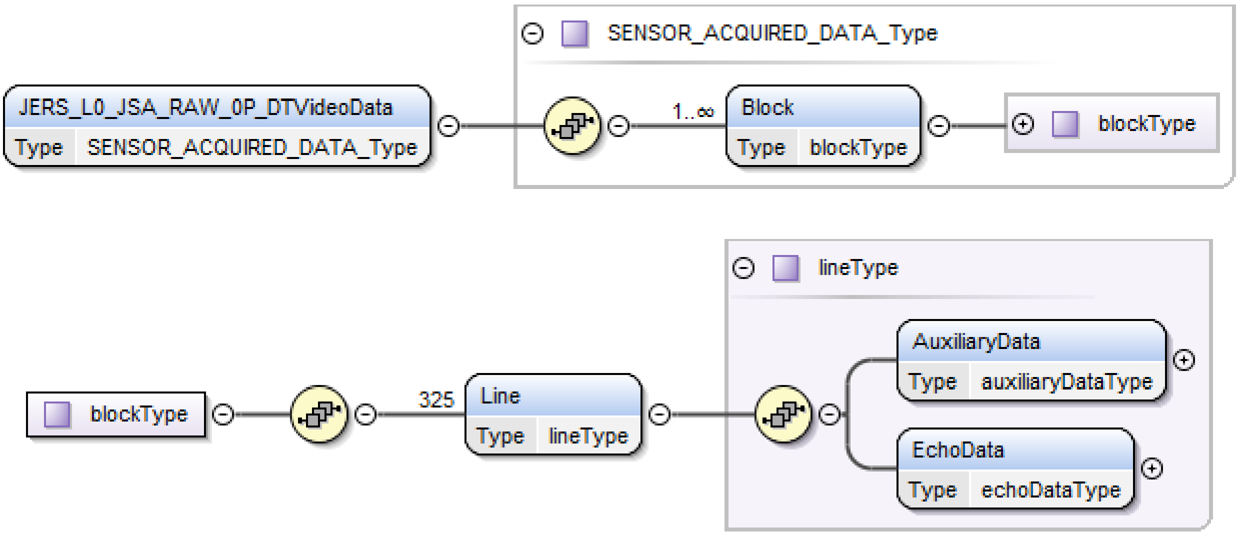

Figure 11: DFDL schema organisation for JSA_RAW_0P product - DTVideoData

3.1.1.8.1. Root Element

#	Name/Description	Format
1	SENSOR ACQUIRED DATA FILE As for other satellites, the JERS SAR Sensor Data are written on tape subdivided in Blocks having the same length to allow the pointing mechanism. Each block contains a fixed number of Lines (this number is stored in the "User Header - Pointers to Tape Data Structure" file). The JERS SAR Observation Data are transmitted as a series of frames. Each frame corresponds to one line of observed or calibration data. Two transmitted channels, named I and Q, have the same Line format and identical auxiliary data content: they differ only for the nature of observed data. In the transcribed data I and Q lines are interleaved each three bits words. Some auxiliary information and line time are extracted and reported in a Line Header for faster processing procedure. The resulting Line is 6264 bytes (56 bytes Auxiliary data + 6208 bytes Echo Data).	SENSOR_ACQUIRED_DATA_Type

Table 37: JERS_L0_JSA_RAW_0P_DTVideoData Specification

3.1.1.8.2. Complex Types

3.1.1.8.2.1.SENSOR_ACQUIRED_DATA_Type

#	Name/Description	Format
1	**Block**	blockType Min Occurs: 1 Max Occurs: unbounded

Table 38: SENSOR_ACQUIRED_DATA_Type Specification

3.1.1.8.2.2.blockType

The number of lines 325 is fixed for JERS and should be the same as the value hold by the "Swath per block" element in the "Pointers to Tape Data Structure" of the "User Header File".

#	Name/Description	Format
1	**Line**	lineType Min Occurs: 325 Max Occurs: 325

Table 39: blockType Specification

3.1.1.8.2.3.lineType

#	Name/Description	Format
1	**AuxiliaryData**	auxiliaryDataType
2	**EchoData**	echoDataType

Table 40: lineType Specification

3.1.1.8.2.4.auxiliaryDataType

#	Name/Description	Format
1	**Day** # of days from 1st January of current year	xs:unsignedInt 4 bytes
2	**Hours** # of hours from midnight	xs:unsignedInt 4 bytes
3	**Minutes** # of minutes	xs:unsignedInt 4 bytes
4	**Seconds** # of seconds	xs:unsignedInt 4 bytes
5	**Milliseconds** # of milliseconds	xs:unsignedInt 4 bytes
6	**PRF_ON_OFF** Pulse Repetition Freq. On = 1, Off = 0	xs:hexBinary 1 bytes
7	**PRF_Code** Code for PRF value: 0x00 = 1505.8 Hz 0x01 = 1530.1 Hz 0x02 = 1555.2 Hz 0x03 = 1581.1 Hz 0x04 = 1606.0 Hz	xs:hexBinary 1 bytes
8	**Calib_Mode** Calibration Mode On/Off: 0 = All Off	xs:hexBinary 1 bytes

#	Name/Description	Format
	1 = CAL On	
9	**Observ_Mode** Observation mode On/Off: 1 = OBS On 0 = OBS Off	xs:hexBinary 1 bytes
10	**OBS_CAL_Start** "1" is shown at first CAL and first OBS Line	xs:hexBinary 1 bytes
11	**Reserved_1** Reserved	xs:hexBinary 3 bytes
12	**Line_Counter** 24 bits Line Counter (masked 0x00FFFFFF)	xs:unsignedInt 4 bytes
13	**Reserved_2** Reserved	xs:unsignedInt 4 bytes
14	**Reserved_3** Reserved	xs:unsignedInt 4 bytes
15	**PRF_value** Measured Pulse Repetition Frequency	xs:double 8 bytes
16	**Line_Scan_Time** Line duration in milliseconds (1000/PRF)	xs:double 8 bytes

Table 41: auxiliaryDataType Specification

3.1.1.8.2.5.echoDataType

#	Name/Description	Format
1	**Sync_code** Synchronization Code. Bits per channel : 30	xs:hexBinary 10 bytes
2	**HK_data** House-Keeping Data. Bits per channel : 69	xs:hexBinary 23 bytes
3	**Line_Counter** Line counter. Bits per channel : 24	xs:hexBinary 8 bytes
4	**Data_and_PCM** Measurement Data and Payload Correction Data. Bits per channel : 18471	xs:hexBinary 6157 bytes
5	**Random_pattern** Bits per channel : 30	xs:hexBinary 10 bytes

Table 42: echoDataType Specification

3.1.2. JSA_OPS_0P

3.1.2.1. DTBlock

This file contains the description of all the blocks in which the pass has been divided and written. It is composed by a variable number of identical units. Each unit describes completely one satellite data block and contains all information to address any segment or any frame within the "Sensor Acquired Data" file. It contains block number of the video data block, the starting time of the first satellite format in the block and the number of swaths contained.

The structure is repeated as many times as the number of blocks recorded in the file. The number of items and the length are specified in the "DTUserHeader" file.

The next figure provides a high level overview of the complex structures used to represent the information of the DTBlock file:

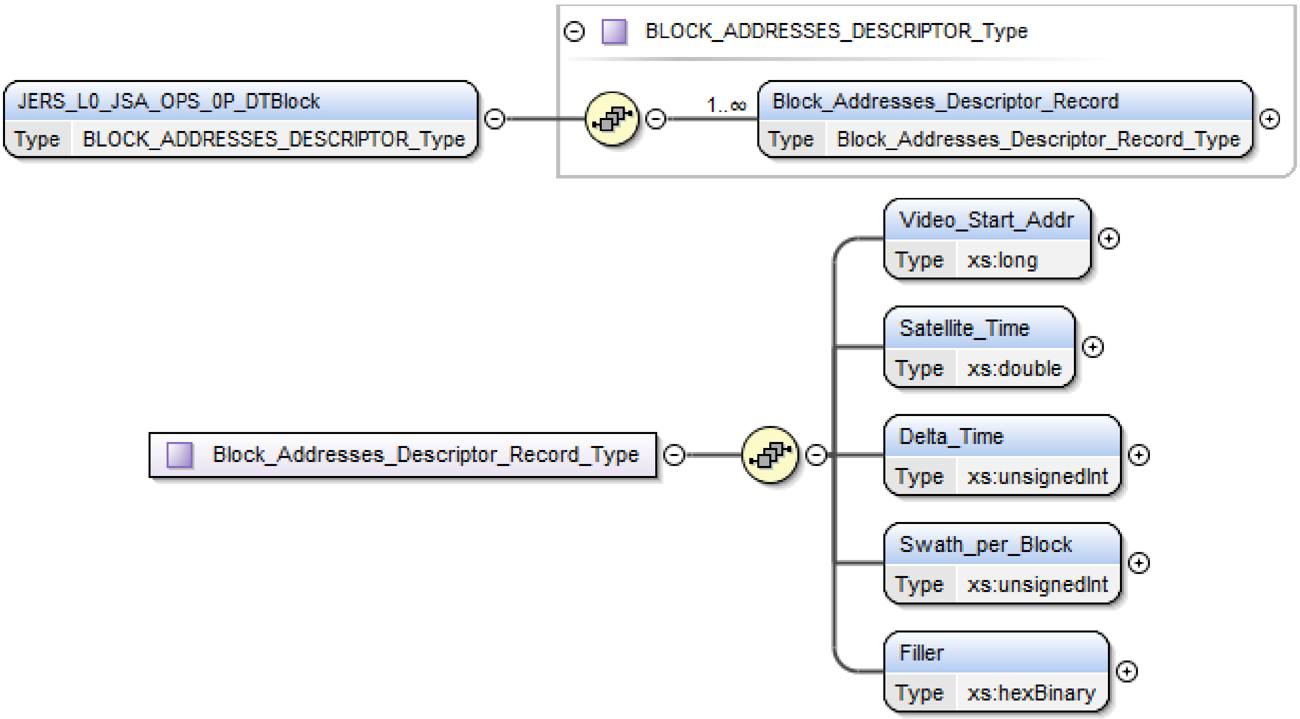

Figure 12: DFDL schema organisation for JSA_OPS_0P product - DTBlock

3.1.2.1.1. Root Element

#	Name/Description	Format
1	**JERS_L0_JSA_OPS_0P_DTBlock** BLOCK ADDRESSES DESCRIPTOR file This file contains the description of all the blocks in which the pass has been divided and written on tape. It is composed by a variable number of identical units. Each unit describes completely one satellite data block and contains all information to address any segment or any frame within the "Sensor Acquired Data" file. It contains block number of the video data block, the starting time of the first satellite format in the block and the number of swaths contained. The structure is repeated as many times as the number of blocks recorded in the file. The number of items and the length are specified	BLOCK_ADDRESSES_DESCRIPTOR_Type

#	Name/Description	Format
	into the "User Header file - Pointer to Tape Data Structure Description Section" (Block Addresses section).	

Table 43: JERS_L0_JSA_OPS_0P_DTBlock Specification

3.1.2.1.2. Complex Types

3.1.2.1.2.1.BLOCK_ADDRESSES_DESCRIPTOR_Type

#	Name/Description	Format
1	**Block_Addresses_Descriptor_Record**	Block_Addresses_Descriptor_Record_Type Min Occurs: 1 Max Occurs: unbounded

Table 44: BLOCK_ADDRESSES_DESCRIPTOR_Type Specification

3.1.2.1.2.2.Block_Addresses_Descriptor_Record_Type

#	Name/Description	Format
1	**Video_Start_Addr** Block number of the video data block	xs:long 4 bytes
2	**Satellite_Time** Time of current block. The time is expressed in Milliseconds from midnight of first block swath.	xs:double 8 bytes
3	**Delta_Time** Time distance between start of acquisition (first block of the file) and current block start The delta time is expressed in Milliseconds	xs:unsignedInt 4 bytes
4	**Swath_per_Block** Number of swaths per block	xs:unsignedInt 4 bytes
5	**Filler** Available fields	xs:hexBinary 12bytes

Table 45: Block_Addresses_Descriptor_Record_Type Specification

3.1.2.2. DTPassID

The DTPassID (Pass Identification Header) contains the information to unambiguously identify the imaging sequence contained in the product.

This record is divided into five logical sections:

- Mission and Instrument Identification
- Ground Stations and Transcription System Identification
- Transcription Identification
- Orbit and Acquisition Identification
- Pointers to Tape Data Structure

The next figure provides a high level overview of the complex structures used to represent the information of the DTPassID file:

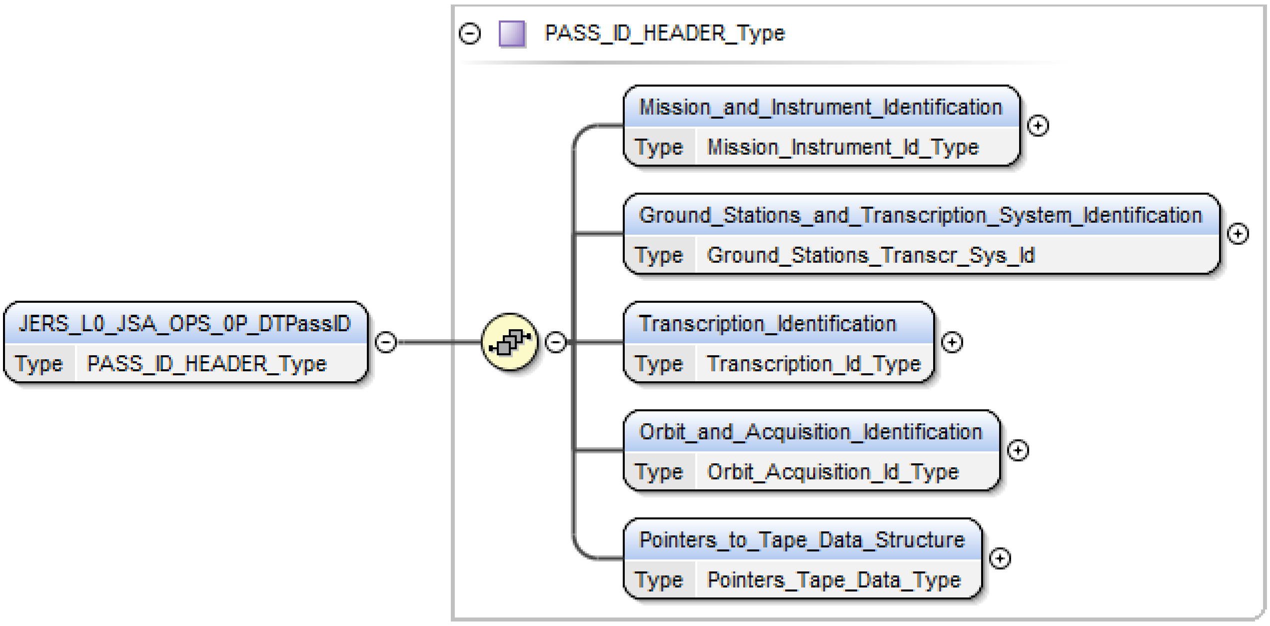

Figure 13: DFDL schema organisation for JSA_OPS_0P product - DTPassID

3.1.2.2.1. Root Element

#	Name/Description	Format
1	**JERS_L0_JSA_OPS_0P_DTPassID** PASS IDENTIFICATION HEADER file The "Pass Identification Header" is the first file of the Transcription Area. It contains the information, available at the beginning of the transcription, to unambiguously identify the imaging sequence contained in the file. This record is divided into five logical sections: 1. Mission and Instrument Identification 2. Ground Stations and Transcription System Identification 3. Transcription Identification 4. Orbit and Acquisition Identification 5. Pointers to Tape Data Structure	PASS_ID_HEADER_Type

Table 46: JERS_L0_JSA_OPS_0P_DTPassID Specification

3.1.2.2.2. Complex Types

3.1.2.2.2.1.PASS_ID_HEADER_Type

#	Name/Description	Format
1	**Mission_and_Instrument_Identification**	Mission_Instrument_Id_Type
2	**Ground_Stations_and_Transcription_System_Identification**	Ground_Stations_Transcr_Sys_Id

#	Name/Description	Format
3	**Transcription_Identification**	Transcription_Id_Type
4	**Orbit_and_Acquisition_Identification**	Orbit_Acquisition_Id_Type
5	**Pointers_to_Tape_Data_Structure**	Pointers_Tape_Data_Type

Table 47: PASS_ID_HEADER_Type Specification

3.1.2.2.2.2.Mission_Instrument_Id_Type

Mission and Instrument Identification

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:hexBinary 76bytes
2	**Satellite_ID** Satellite Code: 1 - LANDSAT 2 - MOS 3 - J-ERS 4 - SPOT 5 - ERS 6 - IRS-C 7 - RADARSAT 8 - NOAA 9 - RESERVED 10 - RESERVED 11 - HELIOS 12 - SHUTTLE 13 - EOSAM 14 - EOSPM	xs:unsignedShort 2 bytes
3	**Mission_ID** Satellite Mission Number	xs:unsignedShort 2 bytes
4	**Instr_Type_ID** Satellite Mission Number: 1 - LANDSAT MSS 2 - LANDSAT TM 3 - LANDSAT ETM 4 - LANDSAT RBV 5 - MOS MESSR 6 - J-ERS VNIR 7 - J-ERS SWIR 8 - Not Used 9 - Not Used 10 - ERS AMI SAR 11 - ERS ATSR 12 - SPOT HRV 13 - J-ERS SAR 14 - NOAA AVHRR 15 - SPOT HRVIR 16 - SHUTTLE XSAR	xs:unsignedShort 2 bytes

#	Name/Description	Format
	17 - MODIS	
5	**Reserved_2** Reserved	xs:unsignedShort Min Occurs: 2 Max Occurs: 2 2 bytes

Table 48: Mission_Instrument_Id_Type Specification

3.1.2.2.2.3.Ground_Stations_Transcr_Sys_Id

Ground Stations and Transcription System Identification

#	Name/Description	Format
1	**Station_ID** Acquisition Ground Station Code: 67 - Adelaide 97 - Agrhymet 10 - AliceSpring 68 - Aspendale 105 - Atlanta 20 - Aussaguel 6 - Bangkok 52 - BantonRouge 49 - Bedford 74 - Beijing 30 - Berlin 31 - Berne 112 - Bishkek 29 - Bremenhaven 28 - Budapest 96 - Cairo 92 - Casey 64 - Cashoiera 32 - Copenhagen 103 - Cordoba 8 - Cotopaxi 23 - Cuiaba 76 - Da-Xing 33 - DeBilt 75 - Dhaka 50 - Downsview 34 - Dundee 51 - Edmonton 7 - Fairbanks 24 - Farnborough 35 - Frascati 1 - Fucino 65 - Funceme 9 - Gatineau 54 - GilmoreCreek	xs:short 2 bytes

#	Name/Description	Format
	36 - Hamburg 19 - HarteBeesHoek 16 - Hatoyama 37 - Helsinki 22 - Hobart 69 - Honolulu 11 - Hyderabad 21 - Islamabad 115 - Itu 77 - Keelung 116 - KhantyMansiysk 2 - Kiruna 78 - Kiyose 113 - Kitab 111 - Kourou 38 - Krakow 91 - KualaLumpur 12 - Kumamoto 39 - Lannion 79 - Lapan 99 - LaReunion 40 - Lasham 106 - Libreville 41 - Madrid 109 - Malindi 80 - Manila 3 - Maspalomas 104 - Matera 93 - McMurdo 53 - Miami 110 - Moscow 98 - Nairobi 55 - NESDIS 108 - Neustrelitz 81 - NewDelhi 102 - Norman 42 - Norrkoping 27 - Oberpfaff 43 - Offenbach 15 - OHiggins 44 - Oslo 94 - Palmer 18 - PariPari 70 - Perth 45 - Prague 25 - Pretoria 13 - PrinceAlbert 57 - RedwoodCity 82 - Riyadh 46 - Rome	

#	Name/Description	Format
	101 - RRSC_Nairobi 66 - Santiago 26 - Scanzano 58 - Scipps Inst 84 - Selangor 87 - Sendai 85 - Seoul 86 - SeoulUniv 83 - Singapore 59 - SiouxFalls 47 - Spitzenbergen 60 - StennisSpace 71 - Sydney 17 - Syowa 90 - Taipei 5 - Tel_Aviv 95 - TerranovaBay 88 - TokaiUniv 89 - TokyoUniv 72 - Townsville 48 - Traben-Trar 4 - Tromso 100 - Tunis 114 - UlanBator 61 - UnivOfAlaska 63 - UnivOfRhodeIsl 62 - UnivOfTexas 56 - WallopsIsl 73 - Wellington 14 - WestFreugh	
2	**Station_DT_ID** Data Transcription Ground Station Code	xs:short 2 bytes
3	**Filler** Padding for stucture alignment	xs:hexBinary 2bytes

Table 49: Ground_Stations_Transcr_Sys_Id Specification

3.1.2.2.2.4.Transcription_Id_Type

Transcription Identification

#	Name/Description	Format
1	**Source_Type** Data Source Type: 1 - AMPEX 14 tracks 2 - Shlumberger 14 tracks 3 - Shlumberger 42 tracks 4 - Penny and Giles 5 - Honeywell HD-96 6 - AMPEX DCRSi	xs:unsignedInt 4 bytes

#	Name/Description	Format
	7 - CREO Optical Tape 8 - Direct Ingestion 9 - SONY DIR 1000 (R)	
2	**Format_SyncType** Format Synchroniser/Decommutator Code: 1 - MCS ERS FS 2 - SPACETEC ERS HR FS 3 - IAI ERS HR FS 4 - LABEN ERS HR FS 5 - SPACETEC/ACS ERS FS 6 - ENERTEC MSS FS 7 - ENERTEC TM FS 8 - ACS SW FORMAT SYNCH 14 - ACS XSAR FORMAT SW SYNCH	xs:unsignedInt 4 bytes
3	**Reserved** Reserved	xs:unsignedInt Min Occurs: 2 Max Occurs: 2 4 bytes

Table 50: Transcription_Id_Type Specification

3.1.2.2.2.5.Orbit_Acquisition_Id_Type

Orbit and Acquisition Identification

#	Name/Description	Format
1	**Track_Number** Track or Data Take Number (when applicable)	xs:integer 4 bytes
2	**Orbit** Orbit number (when applicable)	xs:integer 4 bytes
3	**Reserved_1** Reserved	xs:integer Min Occurs: 9 Max Occurs: 9 4 bytes
4	**Reserved_2** Reserved	xs:short Min Occurs: 3 Max Occurs: 3 2 bytes
5	**Reserved_3** Reserved	xs:hexBinary 18bytes
6	**Transcription_Date** Transcription Date in D M Y (WARNING: Year could be expressed in some tapes as years from 1900)	xs:short Min Occurs: 3 Max Occurs: 3 2 bytes
7	**Reserved_4** Reserved	xs:short Min Occurs: 6 Max Occurs: 6 2 bytes
8	**Filler** Padding for stucture alignment	xs:hexBinary 2bytes

Table 51: Orbit_Acquisition_Id_Type Specification

3.1.2.2.2.6.Pointers_Tape_Data_Type

Pointers to Tape Data Structure

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:integer Min Occurs: 5 Max Occurs: 5 4 bytes
2	**Physical_Address_1** User Header Address. File Number of the User Header. It is the number of files, numbered from DLT start, preceding the User Header file in current Transcription Area.	xs:long 4 bytes
3	**Physical_Address_2** Pass Id. Header Address. File Number of the Pass Id. Header. It is the number of files, numbered from DLT start, preceding the Pass Id. Header file in current Transcription Area.	xs:long 4 bytes
4	**Reserved_2** Reserved	xs:hexBinary 652bytes

Table 52: Pointers_Tape_Data_Type Specification

3.1.2.3. DTSegment

This DTSegment file contains the descriptions of all the segments in which the satellite pass has been divided.

The next figure provides a high level overview of the complex structures used to represent the information of the DTSegment file:

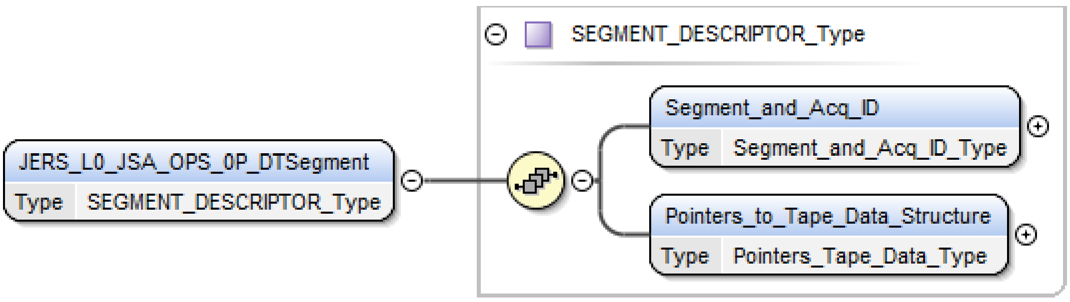

Figure 14: DFDL schema organisation for JSA_OPS_0P product - DTSegment

3.1.2.3.1. Root Element

#	Name/Description	Format
1	**JERS_L0_JSA_OPS_0P_DTSegment** SEGMENT DESCRIPTOR file	SEGMENT_DESCRIPTOR_Type

#	Name/Description	Format
	This file contains the descriptions of all the segments in which the satellite pass has been divided. Each segment is described by one structure. The "Segment Descriptor Structure" is thus repeated as many times as the number of segments recorded in the "Sensor Acquired Data" file. Each segment is completely described by the following fields and contains all information to address it within the video data records. The number of items and the length are specified into the "User Header file - Pointer to Tape Data Structure Description Section" (described in previous paragraph).	

Table 53: JERS_L0_JSA_OPS_0P_DTSegment Specification

3.1.2.3.2. Complex Types

3.1.2.3.2.1.SEGMENT_DESCRIPTOR_Type

#	Name/Description	Format
1	**Segment_and_Acq_ID**	Segment_and_Acq_ID_Type
2	**Pointers_to_Tape_Data_Structure**	Pointers_Tape_Data_Type

Table 54: SEGMENT_DESCRIPTOR_Type Specification

3.1.2.3.2.2.Segment_and_Acq_ID_Type

Segment and Acquisition Identification

#	Name/Description	Format
1	**Acquis_Date_Year** Acquisition Date of the Sat. Pass (Year)	xs:short 2 bytes
2	**Acquis_Date_Month** Acquisition Date of the Sat. Pass (Month)	xs:short 2 bytes
3	**Acquis_Date_Day** Acquisition Date of the Sat. Pass (Day)	xs:short 2 bytes
4	**Acquis_Day** Day in the year of the acquisition	xs:short 2 bytes
5	**Segment_Start_Hours** Start of Segment (Hours)	xs:short 2 bytes
6	**Segment_Start_Min** Start of Segment (Min)	xs:short 2 bytes
7	**Segment_Start_Sec** Start of Segment (Sec)	xs:short 2 bytes
8	**Segment_Start_Millisec** Start of Segment (Millisec)	xs:short 2 bytes
9	**Segment_End_Hours**	xs:short

#	Name/Description	Format
	End of Segment (Hours)	2 bytes
10	**Segment_End_Min** End of Segment (Min)	xs:short 2 bytes
11	**Segment_End_Sec** End of Segment (Sec)	xs:short 2 bytes
12	**Segment_End_Millisec** End of Segment (Millisec)	xs:short 2 bytes
13	**Loaded_Swath** Nr. of lines loaded on tape for this segment	xs:integer 4 bytes
14	**First_Swath** First swath of the segment	xs:integer 4 bytes
15	**Last_Swath** Last swath of the segment	xs:integer 4 bytes
16	**Lost_Swath** Lost swaths of the segment	xs:integer 4 bytes
17	**First_Frame** First frame of the segment (when applicable)	xs:integer 4 bytes
18	**Last_Frame** Last frame of the segment (when applicable)	xs:integer 4 bytes
19	**First_OBC** First On Board Counter or TSID (when applicable)	xs:integer 4 bytes
20	**Last_OBC** Last On Board Counter or TSID (when applicable)	xs:integer 4 bytes

Table 55: Segment_and_Acq_ID_Type Specification

3.1.2.3.2.3.Pointers_Tape_Data_Type

Pointers to Tape Data Structure

#	Name/Description	Format
1	**Starting_Address** Pass Id. Header file Address	xs:long 4 bytes
2	**Swath_Size** Swath length (in bytes) This field is filled only if its value changed between different Segments. If it does not change the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	xs:integer 4 bytes
3	**Swath_per_Block** Number of swaths per block This field is filled only if its value changed between different Segments. If it does not change the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	xs:integer 4 bytes
4	**Nr_of_Blocks** Number of blocks This field is filled only if its value changed between different Segments. If it does not change	xs:integer 4 bytes

#	Name/Description	Format
	the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	
5	**Formats_Per_Swath** Number of formats per swath This field is filled only if its value changed between different Segments. If it does not change the valid value for this field must be read in the User Header (Pointers to Tape Data Structure)	xs:integer 4 bytes
6	**Filler** Filler	xs:hexBinary 52bytes

Table 56: Pointers_Tape_Data_Type Specification

3.1.2.4. DTStatisticFile

The Statistics file constitutes a sort of summary of all transcribed passes.

The next figure provides a high level overview of the complex structures used to represent the information of the DTStatisticFile:

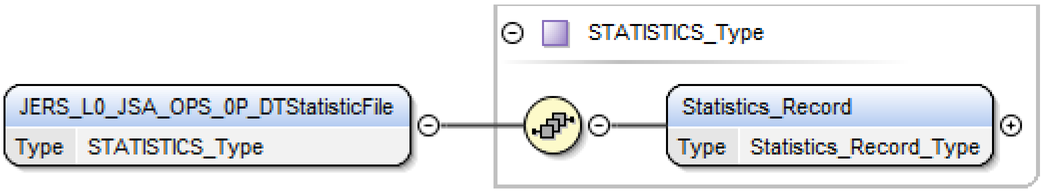

Figure 15: DFDL schema organisation for JSA_OPS_0P product - DTStatisticFile

3.1.2.4.1. Root Element

#	Name/Description	Format
1	**JERS_L0_JSA_OPS_0P_DTStatisticFile** STATISTICS file The Statistics file always follows the Transcription Area in the DLT and constitutes a sort of summary of the passes contained in the DLT. The Statistics File following the last Transcription Area of the cassette constitutes a directory, with information on all the transcribed passes. This structure allows an easy positioning of the tape on the requested pass. To achieve this goal, when the tape inspection is performed, the end of tape is reached without reading any data. Then the control jumps one file back (at the beginning of the last Statistics file). Reading this file the content of the whole DLT can be known. The first record is empty. The successive records are structured according the table below; each of them points to the successive Transcription Area	STATISTICS_Type

#	Name/Description	Format
	stored on the cassette.	

Table 57: JERS_L0_JSA_OPS_0P_DTStatisticFile Specification

3.1.2.4.2. Complex Types

3.1.2.4.2.1.STATISTICS_Type

#	Name/Description	Format
1	**Statistics_Record**	Statistics_Record_Type

Table 58: STATISTICS_Type Specification

3.1.2.4.2.2.Statistics_Record_Type

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:hexBinary 4bytes
2	**Satellite_ID** Satellite Code	xs:unsignedShort 2 bytes
3	**Mission_ID** Mission. Number	xs:unsignedShort 2 bytes
4	**Instr_Type_ID** Instrument Type Code	xs:unsignedShort 2 bytes
5	**Reserved_2** Reserved	xs:unsignedShort Min Occurs: 2 Max Occurs: 2 2 bytes
6	**Station_ID** Acquisition Ground Station Code	xs:unsignedShort 2 bytes
7	**Reserved_3** Reserved	xs:short 2 bytes
8	**Filler** Padding for structure alignment	xs:hexBinary 2bytes
9	**Track_Number** Track Number (when applicable)	xs:integer 4 bytes
10	**Orbit_Number** Orbit number (when applicable)	xs:integer 4 bytes
11	**Reserved_4** Reserved	xs:integer 4 bytes
12	**Number_of_Frames** Number of standard frames (when applicable)	xs:integer 4 bytes
13	**First_Frame** Num of first standard frame (when applicable)	xs:integer 4 bytes
14	**Reserved_5** Reserved	xs:integer Min Occurs: 4 Max Occurs: 4 4 bytes
15	**Acquisition_Date_Year**	xs:short

#	Name/Description	Format
	Acquisition Date (Year)	2 bytes
16	**Acquisition_Date_Month** Acquisition Date (Month)	xs:short 2 bytes
17	**Acquisition_Date_Day** Acquisition Date (Month)	xs:short 2 bytes
18	**Acquisition_Day** Acquisition Day of the year	xs:short 2 bytes
19	**Acquisition_Start_Hours** Start of acquisition (Hours)	xs:short 2 bytes
20	**Acquisition_Start_Min** Start of acquisition (Min)	xs:short 2 bytes
21	**Acquisition_Start_Sec** Start of acquisition (Sec)	xs:short 2 bytes
22	**Acquisition_Start_Millisec** Start of acquisition (Millisec)	xs:short 2 bytes
23	**Acquisition_End_Hours** End of acquisition (Hours)	xs:short 2 bytes
24	**Acquisition_End_Min** End of acquisition (Min)	xs:short 2 bytes
25	**Acquisition_End_Sec** End of acquisition (Sec)	xs:short 2 bytes
26	**Acquisition_End_Millisec** End of acquisition (Millisec)	xs:short 2 bytes
27	**Transcription_Date_Day** Transcription Date (Day)	xs:short 2 bytes
28	**Transcription_Date_Month** Transcription Date (Month)	xs:short 2 bytes
29	**Transcription_Date_Year** Transcription Date (Year)(WARNING: Year could be expressed in some tapes as years from 1900)	xs:short 2 bytes
30	**Reserved_6** Reserved	xs:short Min Occurs: 6 Max Occurs: 6 2 bytes
31	**Filler** Padding for structure alignment	xs:hexBinary 2bytes
32	**Reserved_7** Reserved	xs:integer Min Occurs: 10 Max Occurs: 10 4 bytes
33	**Physical_Address_1** User Header file number	xs:long 4 bytes
34	**Physical_Address_2** Pass Id. Header file number	xs:long 4 bytes
35	**Reserved_8** Reserved	xs:hexBinary 697bytes
36	**Copy_Date_Day** Date when this record has been generated as a copy from another tape (Day)	xs:unsignedByte 1bytes

#	Name/Description	Format
37	**Copy_Date_Month** Date when this record has been generated as a copy from another tape (Month)	xs:unsignedByte 1bytes
38	**Copy_Date_Year** Date when this record has been generated as a copy from another tape (Year)	xs:unsignedByte 1bytes
39	**Copy_Source_Tape_Number** Number of the source tape from where this record was generated	xs:long 4 bytes
40	**Copy_Flag** 1 = this is a copied record 0 = this is the original transcribed record	xs:unsignedByte 1bytes
41	**Copy_Source_Media_Type** 4 = DLT 2 = SONY ID1	xs:unsignedByte 1bytes
42	**Reserved_9** Reserved	xs:unsignedByte 2bytes

Table 59: Statistics_Record_Type Specification

3.1.2.5. DTUserHeader

The DTUserHeader file contains the acquisition description as well as the logical and physical file structure. It contains all the parameters of the imaging sequence, the orbital parameters, the information about acquisition station, the description of the file structure and contents and all information necessary for further processing. It has the same structure for all satellites transcriptions.

The next figure provides a high level overview of the complex structures used to represent the information of the DTUserHeader file:

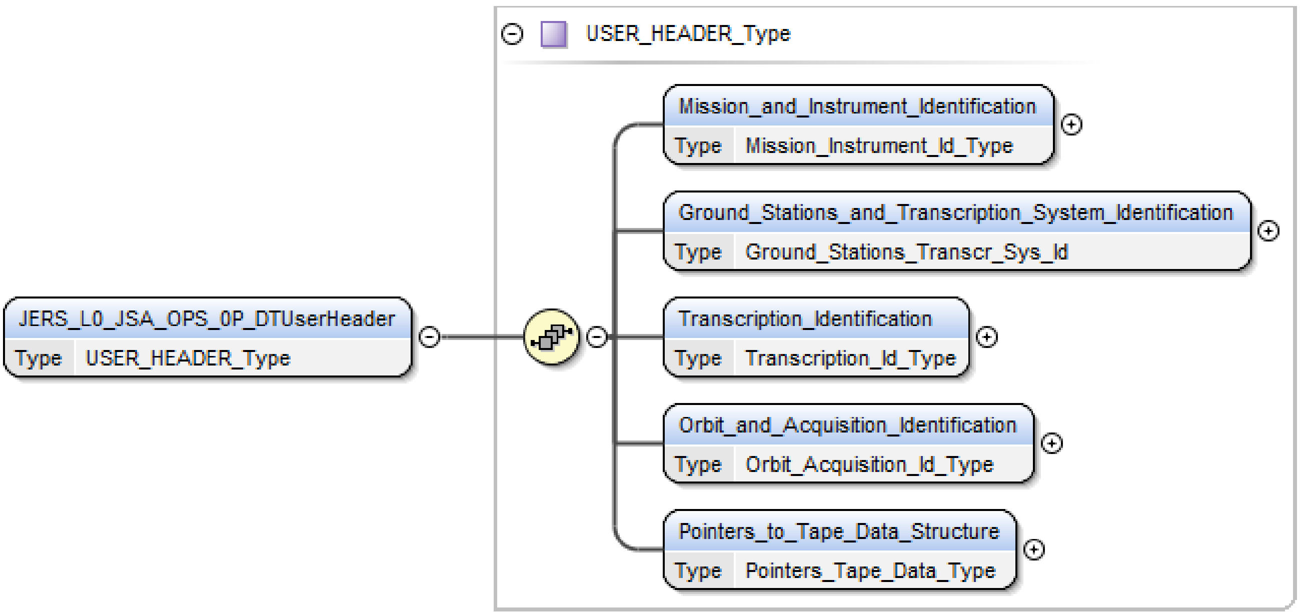

Figure 16: DFDL schema organisation for JSA_OPS_0P product - DTUserHeader

3.1.2.5.1. Root Element

#	Name/Description	Format
1	**JERS_L0_JSA_OPS_0P_DTUserHeader** USER HEADER file The "User Header" file contains the acquisition description as well as the logical and physical file structure. It contains all the parameters of the imaging sequence, the orbital parameters, the information about acquisition station, the description of the file structure and contents and all information necessary for further processing. It has the same structure for all satellites transcriptions. The file is divided into five logical sections: 1. Mission and Instrument Identification 2. Ground Stations and Transcription System Identification 3. Transcription Identification 4. Orbit and Acquisition Identification 5. Pointers to Tape Data Structure	USER_HEADER_Type

Table 60: JERS_L0_JSA_OPS_0P_DTUserHeader Specification

3.1.2.5.2. Complex Types

3.1.2.5.2.1. USER_HEADER_Type

#	Name/Description	Format
1	**Mission_and_Instrument_Identification**	Mission_Instrument_Id_Type
2	**Ground_Stations_and_Transcription_System_Identification**	Ground_Stations_Transcr_Sys_Id
3	**Transcription_Identification**	Transcription_Id_Type
4	**Orbit_and_Acquisition_Identification**	Orbit_Acquisition_Id_Type
5	**Pointers_to_Tape_Data_Structure**	Pointers_Tape_Data_Type

Table 61: USER_HEADER_Type Specification

3.1.2.5.2.2. Mission_Instrument_Id_Type

Mission and Instrument Identification

#	Name/Description	Format
1	**Reserved_1** Reserved	xs:hexBinary 76 bytes
2	**Satellite_ID** Satellite Code:	xs:short 2 bytes

#	Name/Description	Format
	1 - LANDSAT 2 - MOS 3 - J-ERS 4 - SPOT 5 - ERS 6 - IRS-C 7 - RADARSAT 8 - NOAA 9 - RESERVED 10 - RESERVED 11 - HELIOS 12 - SHUTTLE 13 - EOSAM 14 - EOSPM	
3	**Mission_ID** Satellite Mission Number	xs:short 2 bytes
4	**Instr_Type_ID** Satellite Mission Number: 1 - LANDSAT MSS 2 - LANDSAT TM 3 - LANDSAT ETM 4 - LANDSAT RBV 5 - MOS MESSR 6 - J-ERS VNIR 7 - J-ERS SWIR 8 - Not Used 9 - Not Used 10 - ERS AMI SAR 11 - ERS ATSR 12 - SPOT HRV 13 - J-ERS SAR 14 - NOAA AVHRR 15 - SPOT HRVIR 16 - SHUTTLE XSAR 17 - MODIS	xs:short 2 bytes
5	**Instr_Number** Instrument number (when applicable)	xs:short 2 bytes
6	**Transm_Channel** Instrument number (when applicable)	xs:short 2 bytes

Table 62: Mission_Instrument_Id_Type Specification

3.1.2.5.2.3.Ground_Stations_Transcr_Sys_Id

Ground Stations and Transcription System Identification

#	Name/Description	Format
1	**Station_ID** Acquisition Ground Station Code:	xs:short 2 bytes

#	Name/Description	Format
	67 - Adelaide 97 - Agrhymet 10 - AliceSpring 68 - Aspendale 105 - Atlanta 20 - Aussaguel 6 - Bangkok 52 - BantonRouge 49 - Bedford 74 - Beijing 30 - Berlin 31 - Berne 112 - Bishkek 29 - Bremenhaven 28 - Budapest 96 - Cairo 92 - Casey 64 - Cashoiera 32 - Copenhagen 103 - Cordoba 8 - Cotopaxi 23 - Cuiaba 76 - Da-Xing 33 - DeBilt 75 - Dhaka 50 - Downsview 34 - Dundee 51 - Edmonton 7 - Fairbanks 24 - Farnborough 35 - Frascati 1 - Fucino 65 - Funceme 9 - Gatineau 54 - GilmoreCreek 36 - Hamburg 19 - HarteBeesHoek 16 - Hatoyama 37 - Helsinki 22 - Hobart 69 - Honolulu 11 - Hyderabad 21 - Islamabad 115 - Itu 77 - Keelung 116 - KhantyMansiysk 2 - Kiruna 78 - Kiyose 113 - Kitab 111 - Kourou	

#	Name/Description	Format
	38 - Krakow 91 - KualaLumpur 12 - Kumamoto 39 - Lannion 79 - Lapan 99 - LaReunion 40 - Lasham 106 - Libreville 41 - Madrid 109 - Malindi 80 - Manila 3 - Maspalomas 104 - Matera 93 - McMurdo 53 - Miami 110 - Moscow 98 - Nairobi 55 - NESDIS 108 - Neustrelitz 81 - NewDelhi 102 - Norman 42 - Norrkoping 27 - Oberpfaff 43 - Offenbach 15 - OHiggins 44 - Oslo 94 - Palmer 18 - PariPari 70 - Perth 45 - Prague 25 - Pretoria 13 - PrinceAlbert 57 - RedwoodCity 82 - Riyadh 46 - Rome 101 - RRSC_Nairobi 66 - Santiago 26 - Scanzano 58 - Scipps Inst 84 - Selangor 87 - Sendai 85 - Seoul 86 - SeoulUniv 83 - Singapore 59 - SiouxFalls 47 - Spitzenbergen 60 - StennisSpace 71 - Sydney 17 - Syowa 90 - Taipei	

#	Name/Description	Format
	5 - Tel_Aviv 95 - TerranovaBay 88 - TokaiUniv 89 - TokyoUniv 72 - Townsville 48 - Traben-Trar 4 - Tromso 100 - Tunis 114 - UlanBator 61 - UnivOfAlaska 63 - UnivOfRhodeIsl 62 - UnivOfTexas 56 - WallopsIsl 73 - Wellington 14 - WestFreugh	
2	**Station_DT_ID** Data Transcription Ground Station Code	xs:short 2 bytes
3	**Filler** Padding for stucture alignment	xs:hexBinary 2 bytes

Table 63: Ground_Stations_Transcr_Sys_Id Specification

3.1.2.5.2.4. Transcription_Id_Type

Transcription Identification

#	Name/Description	Format
1	**Input_HddrType** HDDR Code	xs:unsignedInt 4 bytes
2	**Format_SyncType** Format Synchroniser/Decommutator Code: 1 - MCS ERS FS 2 - SPACETEC ERS HR FS 3 - IAI ERS HR FS 4 - LABEN ERS HR FS 5 - SPACETEC/ACS ERS FS 6 - ENERTEC MSS FS 7 - ENERTEC TM FS 8 - ACS SW FORMAT SYNCH 14 - ACS XSAR FORMAT SW SYNCH	xs:unsignedInt 4 bytes
3	**Reserved** Reserved	xs:unsignedInt Min Occurs: 2 Max Occurs: 2 4 bytes

Table 64: Transcription_Id_Type Specification

3.1.2.5.2.5.Orbit_Acquisition_Id_Type

Orbit and Acquisition Identification

#	Name/Description	Format
1	**Track_Number** Track or Data Take Number (when applicable)	xs:integer 4 bytes
2	**Orbit_Number** Orbit number (when applicable)	xs:integer 4 bytes
3	**Cycle_Number** Cycle number (when applicable)	xs:integer 4 bytes
4	**Numb_of_Frames** Number of standard frames (when applicable)	xs:integer 4 bytes
5	**First_Frame** Num. of first standard frame (when applicable)	xs:integer 4 bytes
6	**Reserved** Reserved	xs:unsignedInt Min Occurs: 4 Max Occurs: 4 4 bytes
7	**First_OBC** 1st On Board Counter (when applicable)	xs:unsignedInt 4 bytes
8	**Last_OBC** Last On Board Counter (when applicable)	xs:unsignedInt 4 bytes
9	**Acquis_Date_Year** Acquisition Date (Year)	xs:unsignedShort 2 bytes
10	**Acquis_Date_Month** Acquisition Date (Month)	xs:unsignedShort 2 bytes
11	**Acquis_Date_Day** Acquisition Date (Day)	xs:unsignedShort 2 bytes
12	**Acquis_Day** Day in the year of the acquisition	xs:unsignedShort 2 bytes
13	**Acquis_start_Hour** Start of acquisition (Hour)	xs:unsignedShort 2 bytes
14	**Acquis_start_Min** Start of acquisition (Minutes)	xs:unsignedShort 2 bytes
15	**Acquis_start_Sec** Start of acquisition (Seconds)	xs:unsignedShort 2 bytes
16	**Acquis_start_Millisec** Start of acquisition (Milliseconds)	xs:unsignedShort 2 bytes
17	**Acquis_end_Hour** End of acquisition (Hours)	xs:unsignedShort 2 bytes
18	**Acquis_end_Min** End of acquisition (Minutes)	xs:unsignedShort 2 bytes
19	**Acquis_end_Sec** End of acquisition (Seconds)	xs:unsignedShort 2 bytes
20	**Acquis_end_Millisec** End of acquisition (Milliseconds)	xs:unsignedShort 2 bytes
21	**Transcription_Date_Day** Transcription Date in Days	xs:unsignedShort 2 bytes
22	**Transcription_Date_Month**	xs:unsignedShort

#	Name/Description	Format
	Transcription Date in Months	2 bytes
23	**Transcription_Date_Year** Transcription Date in Years (WARNING: Year could be expressed in some tapes as years from 1900)	xs:unsignedShort 2 bytes
24	**Transcription_Start_Hour** Transcription start in Hours	xs:unsignedShort 2 bytes
25	**Transcription_Start_Min** Transcription start in Minutes	xs:unsignedShort 2 bytes
26	**Transcription_Start_Sec** Transcription start in Seconds	xs:unsignedShort 2 bytes
27	**Transcription_End_Hour** Transcription end in Hours	xs:unsignedShort 2 bytes
28	**Transcription_End_Min** Transcription end in Minutes	xs:unsignedShort 2 bytes
29	**Transcription_End_Sec** Transcription end in Seconds	xs:unsignedShort 2 bytes
30	**Filler** Padding for stucture alignment	xs:hexBinary 2 bytes

Table 65: Orbit_Acquisition_Id_Type Specification

3.1.2.5.2.6.Pointers_Tape_Data_Type

This structure is meaningful only in the "User Header" file (it is empty in "Pass Id. Header"). The last field of the first area (Nr_of_Files) indicates how many files follow the "User Header" inside the same Transcription Area (same passage).
This number has been taken as a parameter to allow the maximum flexibility.
In the Transcription Systems presently designed and installed the parameter "Nr_of_Files" can be 2 for JERS VNIR.

The 10 blocks which follow "Nr_of Files" describes the files following the "User Header" in current "Transcription Area". Each of these blocks describes one file. The number of blocks actually filled is thus equal to "Nr_of_Files"

In the JERS VNIR case there are 2 blocks filled, which correspond respectively to:
1. the "Segment Descriptor" file
2. the "Block Addresses Descriptor" file.

#	Name/Description	Format
1	**Num_of_segments** Number of segments (when applicable)	xs:integer 4 bytes
2	**Loaded_Swath** Number of transcribed swaths	xs:integer 4 bytes
3	**Swath_Size** Swath length (in bytes)	xs:integer 4 bytes
4	**Swath_per_Block** Number of swaths per block	xs:integer 4 bytes
5	**Nr_of_Blocks** Number of blocks	xs:integer 4 bytes

#	Name/Description	Format
6	**Physical_Address_1** User Header Address. File Number of the User Header. It is the number of files, numbered from DLT start, preceding the User Header file in current Transcription Area.	xs:long 4 bytes
7	**Physical_Address_2** Pass Id. Header Address. File Number of the Pass Id. Header. It is the number of files, numbered from DLT start, preceding the Pass Id. Header file in current Transcription Area.	xs:long 4 bytes
8	**Nr_of_Files** Number of files following the present	xs:integer 4 bytes
9	**File**	Pointers_Tape_Data_File_Type Min Occurs: 10 Max Occurs: 10
10	**Reserved** Reserved	xs:hexBinary 8bytes

Table 66: Pointers_Tape_Data_Type Specification

3.1.2.5.2.7.Pointers_Tape_Data_File_Type

#	Name/Description	Format
1	**File_ID** File type identifier	xs:integer 4 bytes
2	**File_Num** Number of physical records	xs:integer 4 bytes
3	**Record_Length** Physical record length in bytes	xs:integer 4 bytes
4	**Elem_Num** Number of logical element per record	xs:integer 4 bytes
5	**Elem_Length** Logical element length in bytes	xs:integer 4 bytes
6	**Filler** Spare	xs:hexBinary 44 bytes

Table 67: Pointers_Tape_Data_File_Type Specification

3.1.2.6. DTVideoData

The JERS VNIR Sensor data of one imaging sequence are stored consecutively in the DTVideoData file. The data corresponding to one pass are subdivided in Blocks having the same length (about 2 Megabytes). Each block contains a fixed number of Major Frames (this number is stored in the "DTUserHeader" file).

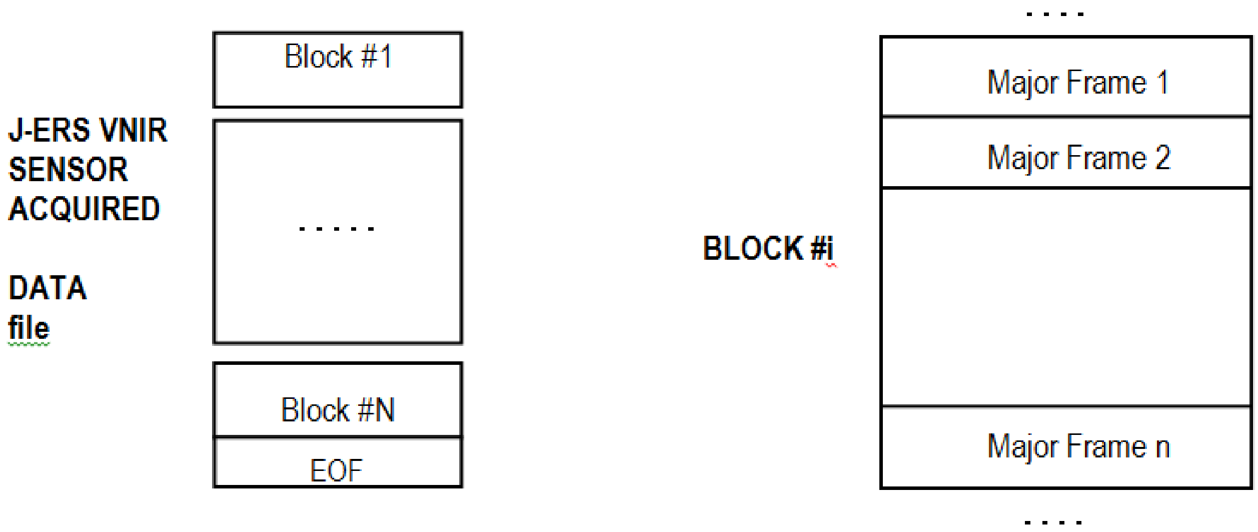

Figure 17: DTVideoData Block organisation – JERS-OPS

The “Major Frame” is composed by a set of 16 lines of observed and calibration data; each Major Frame (fixed length) contains annotations and measurement data.

The following figure provides an overview of the Measurement Data block content:

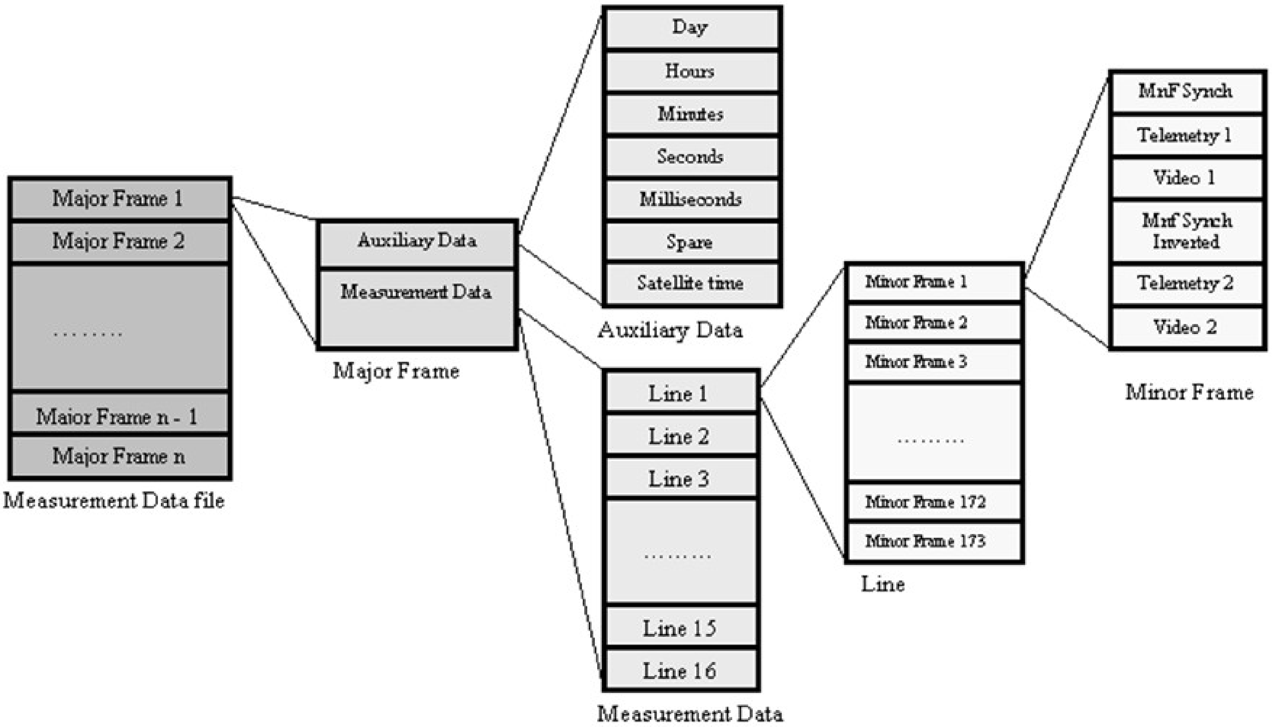

Figure 18: DTVideoData Major Frame organisation – JERS-OPS

The next figure provides a high level overview of the complex structures used to represent the information of the DTVideoData file:

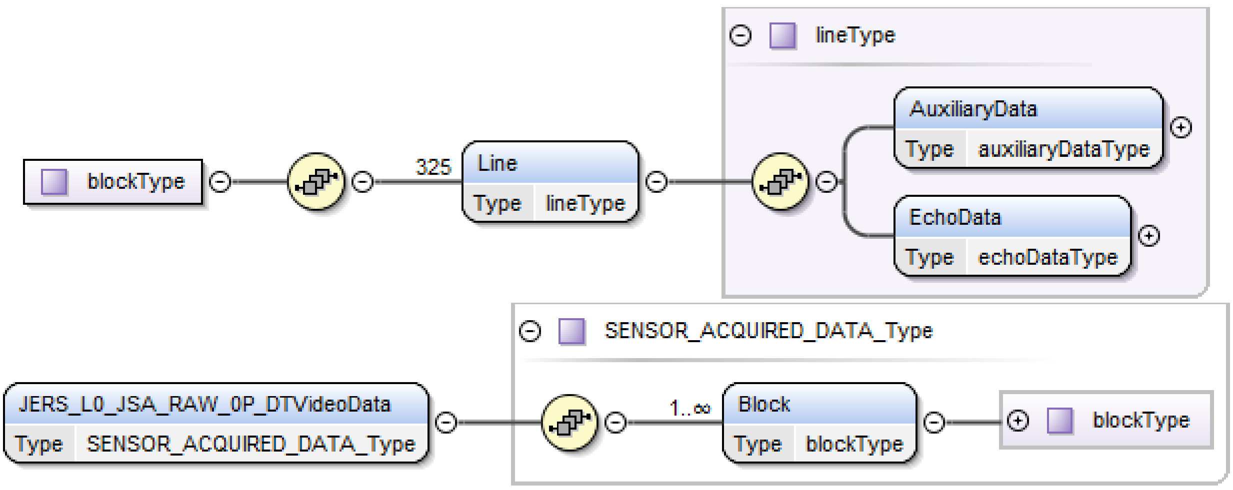

Figure 19: DFDL schema organisation for JSA_OPS_0P product - DTVideoData

3.1.2.6.1. Root Element

#	Name/Description	Format
1	**JERS_L0_JSA_OPS_0P_DTVideoData** SENSOR ACQUIRED DATA FILE The JERS VNIR Sensor Data are subdivided in Blocks having the same length (about 2.2	SENSOR_ACQUIRED_DATA_Type

#	Name/Description	Format
	Megabytes) to allow the pointing mechanism. Each block contains a fixed number of Major Frames (typically 8). This number has to be verified from the "User Header - Pointers to Tape Data Structure" file. The "Major Frame" is composed by a set of 16 lines of observed and calibration data; each Major Frame (fixed length, 282368 bytes long) contains annotations (32 bytes) and measurement data (282336 bytes). Some auxiliary information and line time are extracted and reported in a Line Header for faster processing procedure. The resulting Line is 6264 bytes (56 bytes Auxiliary data + 6208 bytes Echo Data).	

Table 68: JERS_L0_JSA_OPS_0P_DTVideoData Specification

3.1.2.6.2. Complex Types

3.1.2.6.2.1.SENSOR_ACQUIRED_DATA_Type

#	Name/Description	Format
1	**Block**	blockType Min Occurs: 1 Max Occurs: 1

Table 69: SENSOR_ACQUIRED_DATA_Type Specification

3.1.2.6.2.2.blockType

Each Major Frame is 282368 bytes long

#	Name/Description	Format
1	**MajorFrame**	MajorFrameType Min Occurs: 8 Max Occurs: 8

Table 70: blockType Specification

3.1.2.6.2.3.MajorFrameType

The "Major Frame" is composed by a set of 16 lines of observed and calibration data; each Major Frame (fixed length, 282368 bytes long) contains
* annotations (32 bytes)
* measurement data (282336 bytes).

#	Name/Description	Format
1	**AuxiliaryData**	auxiliaryDataType

#	Name/Description	Format
2	**MeasurementData**	measurementDataType

Table 71: MajorFrameType Specification

3.1.2.6.2.4.auxiliaryDataType

#	Name/Description	Format
1	**Day** # of days from 1st January of current year	xs:unsignedInt 4 bytes
2	**Hours** # of hours from midnight	xs:unsignedInt 4 bytes
3	**Minutes** # of minutes	xs:unsignedInt 4 bytes
4	**Seconds** # of seconds	xs:unsignedInt 4 bytes
5	**Milliseconds** # of milliseconds	xs:unsignedInt 4 bytes
6	**Spare** Spare field	xs:hexBinary 4 bytes
7	**Satellite_Time** Satellite time (milliseconds from 1st January of current year)	xs:double 8 bytes

Table 72: auxiliaryDataType Specification

3.1.2.6.2.5.measurementDataType

The Measurement Data field is 282336 bytes long and composed by 16 lines of observed /calibration data.

#	Name/Description	Format
1	**line_01**	minorFrameType Min Occurs: 173 Max Occurs: 173
2	**line_02**	minorFrameType Min Occurs: 173 Max Occurs: 173
3	**line_03**	minorFrameType Min Occurs: 173 Max Occurs: 173
4	**line_04**	minorFrameType Min Occurs: 173 Max Occurs: 173
5	**line_05**	minorFrameType Min Occurs: 173 Max Occurs: 173
6	**line_06**	minorFrameType Min Occurs: 173 Max Occurs: 173
7	**line_07**	minorFrameType

#	Name/Description	Format
		Min Occurs: 173 Max Occurs: 173
8	**line_08**	minorFrameType Min Occurs: 173 Max Occurs: 173
9	**line_09**	minorFrameType Min Occurs: 173 Max Occurs: 173
10	**line_10**	minorFrameType Min Occurs: 173 Max Occurs: 173
11	**line_11**	minorFrameType Min Occurs: 173 Max Occurs: 173
12	**line_12**	minorFrameType Min Occurs: 173 Max Occurs: 173
13	**line_13**	minorFrameType Min Occurs: 173 Max Occurs: 173
14	**line_14**	minorFrameType Min Occurs: 173 Max Occurs: 173
15	**line_15**	minorFrameType Min Occurs: 173 Max Occurs: 173
16	**line_16**	minorFrameType Min Occurs: 173 Max Occurs: 173

Table 73: measurementDataType Specification

3.1.2.6.2.6.minorFrameType

#	Name/Description	Format
1	**Synch_code**	xs:hexBinary 2 bytes
2	**Telemetry_1**	xs:hexBinary 1 bytes
3	**Video_1**	xs:hexBinary 48 bytes
4	**Synch_inverted**	xs:hexBinary 2 bytes
5	**Telemetry_2**	xs:hexBinary 1 bytes
6	**Video_2**	xs:hexBinary 48 bytes

Table 74: minorFrameType Specification