CZCS LEVEL 2 PRODUCT

CCT FORMAT SPECIFICATION

REV. 1-1

Jan 10, 1992

DOCUMENT HISTORY:

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October 4,1990	Rev 0-1	Revised based on the discussion with JRC P.4,9,10,13,28,29,30,31,32,33,34,35,36, 37,38,39,41,47
October 23,1990	Rev 0-2	Addition of the Quicklook File,etc. P.1,3-1,4,5,6,7,7-1,7-2,7-3,7-4,7-5, 8,9,12,13,28,29,30,31,32,40,48,49
Nov.27, 1990	Rev 0-3	Correction of the errors P.10,11,12,29,30,31,32,33,34,35,36,37, 38,39,41,49
Dec.7, 1990	Rev 0-4	Rivision of the ozone and pressure record,etc.
Feb.22,1991	Rev 0-5	Revised based on JRC/ESA IF meeting
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.....		
Jan.10,1992	Rev 1-1	Definitive document revised by ESA & JRC accordingly to the software delivery "CZCS Level 2 processing & archiving"

1. Overview of the Standard Family Format

The CZCS Level-2 digital products are recorded on Computer Compatible Tapes (CCTs) in a format that is conformed to the Standard Family Format (SFF) conventions. This format has been recommended by the Landsat Technical Working Group (LTWG) and the Committee on Earth Observation Systems (CEOS). The SFF allows to read the same software data on CCTs that have been generated by different stations.

Conventionally, the individual tape is referred to as a physical volume. The logical volume refers to data files logically grouped on the tape. The SFF allows that more than one logical volume (a volume set) be stored on the same physical volume. One logical volume can also be split between different physical volumes.

The Standard Family of CCT Formats uses the "superstructure concept" in which data are organized at four distinct levels: volume, file, record, and data field. Data products are organized into two main logical volumes: Imagery and Supplemental Volumes. The Imagery Volume contains the imagery data itself and related image-synchronized information, with data only related to the scene. The Supplemental Volume is generally defined to contain station-related processing data such as annotation, ephemeris and attitude data. The Null Volume ends a logical volume.

Typical logical volume consists of the following files(Fig.1):
- a volume directory file which contains the logical and physical structure of the tape (the number of all files on the CCT: the position and content of these files; the number of records and maximum record length within each files);
- the data file(S) : the imagery files are preceded by a quicklook file & leader file and followed by a trailer file (the quicklook file contains quicklook image and catalogue information; the leader file contains scene introductory information; the trailer file contains quality flags as determined during the scene processing);
- a null volume directory file which indicates the end of the logical volume of a volume set (a collection of logical volumes; when the logical volume spans over more than one physical volume, the volume directory file for that logical volume is repeated at the start of the new tape.

The superstructure records consist of:
- a volume descriptor record which contains the information that applies to the logical volume as a whole such as information on the data source, physical volume identification, logical volume identification within the tape or tape set and specifies the number of file pointer records (hence the number of data files) and text records;
- a file pointer record for each of the files to supply the number and name of the associated data files, the maximum record length and the type and format of the data;
- text record(s) corresponding to the "comment statements" of a

computer programme to provide information in human readable form. ESA/EPO uses the text record to specify the product type and processing performed, the location, data and time of product creation, the specific scene identification and the physical tape identification. It is therefore used to confirm that the correct tape is being processed.

Each data file starts with a file descriptor record which explains the number of data in the file and contains location of significant data field: the "fixed" data segment specifies the file number, name and format and the "variable"segment the location of important data partitions in the file.

All records start with the record introductory information stored in binary(total of 12 bytes) which consists of:
- record sequence number (4 bytes)
- record type (4 bytes)
- record length (4 bytes)

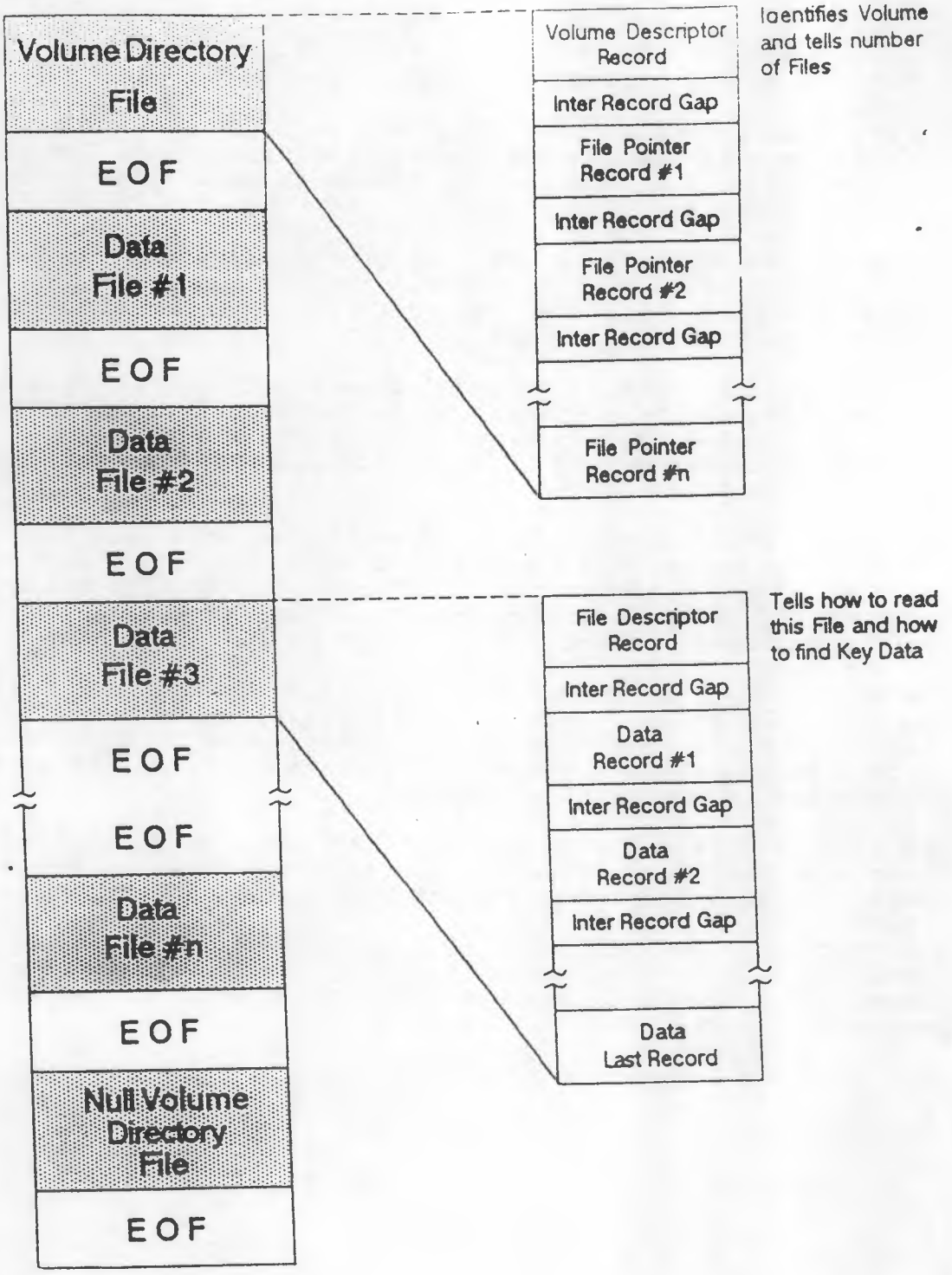


Figure 1: The Standard CCT Format – Overview

2 Overview of the CZCS Level-2 CCT format

The information contained in the ESA/EPO CZCS Level-2 CCT products is organized in one Imagery logical volume. The data organization within each logical volume is summarized below and in figure 2 and 3.

The Volume directory file has 6 records, namely the Volume descriptor and four file pointers (for the Quicklook, the Leader, the Image, and the Trailer files), plus a Text record. Each record is 360 bytes long.

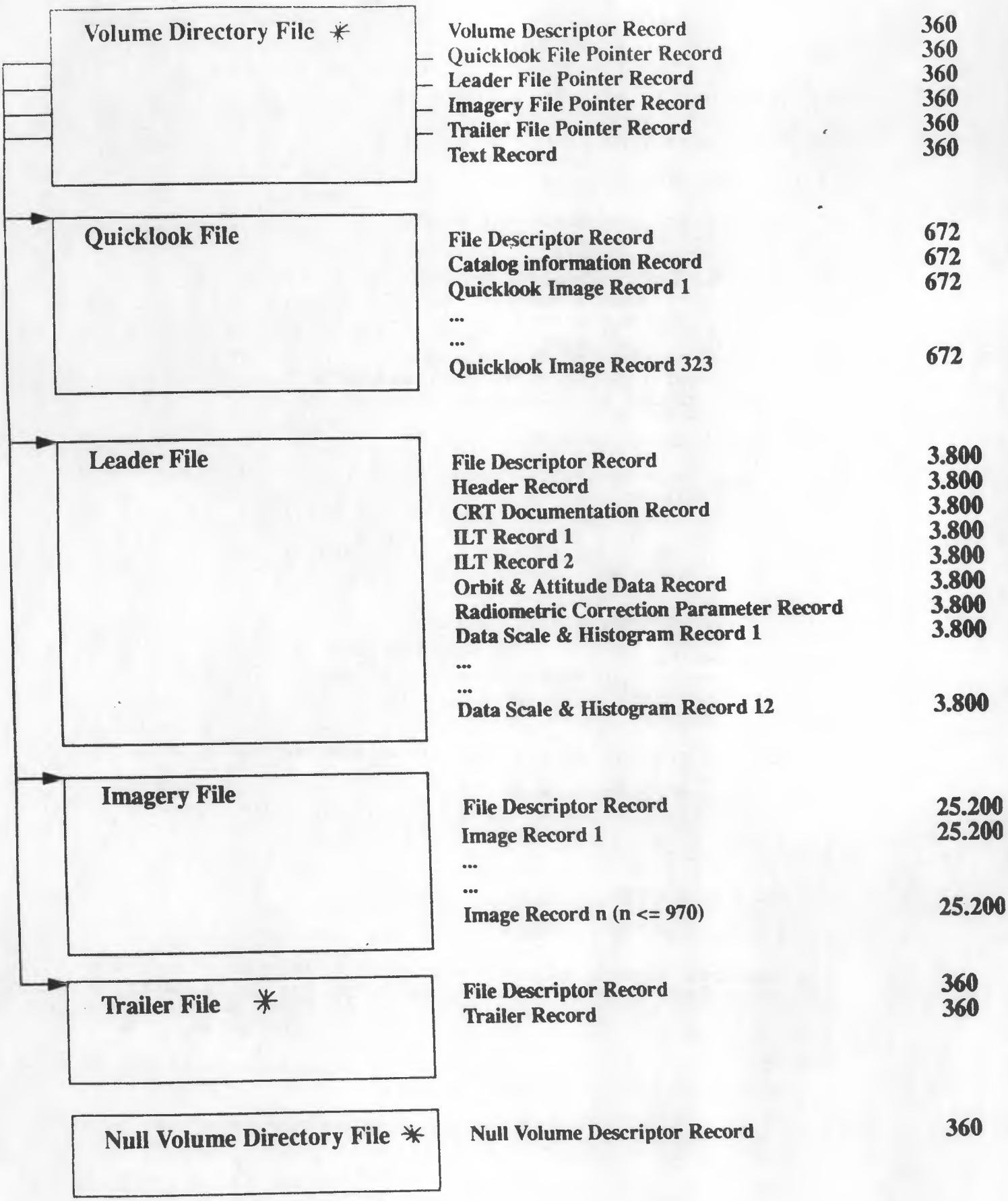
The imagery data file is preceded by a Quicklook file & a Leader file and followed by a Trailer file. The Quicklook file contains up to 325 records. A file descriptor record, a catalogue information record and up to 323 quicklook image records. Each record is 672 bytes long.

The leader file has 21 fixed records, namely the file descriptor, the scene header and 19 ancillary records. The ancillary records are CRT documentation record, 2 ILT records, orbit & attitude data record, radiometric correction parameter record, and 12 data scale & histogram records. Each record is 3800 bytes long.

The image file contains up to 971 records: a file descriptor record and up to 970 image records of 25200 bytes each. The imagery data are organized in Line INterleaved by N-bands (LINN); in this organization the data for one scan line in the 12 bands are grouped in one physical record.

The trailer file contains some quality flags as determined during the scene processing. The file contains 2 records of 360 bytes each: the file descriptor and the trailer record.

The image data for CZCS Level-2 products are calibrated, atmospheric effect corrected, and converted to the geophysical parameters. Geometric parameters are contained, but no geometric correction is applied.



* Not present in "tar" Format

3. Logical volume content description

3.1 Volume Directory File

3.1.1 Volume Descriptor Record

The volume descriptor record contains:
- the software release number
- the tape identification
- the logical volume identification
- the logical volume generating country
- the logical volume generating agency
- the logical volume generating facility
- the number of the logical volume
- the number of file pointer records
- the total number of records in the file

3.1.2 File Pointer Records

Each pointer record provides information about its referenced or associated file:
- class: Quicklook, Leader, Imagery, or Trailer
- class code: QUIC, LEAD, IMOP, or TRAI
- data type: MIXED BINARY AND ASCII or BINARY ONLY
- data type code: MBAA (mixed binary and ASCII) or BINO (binary only)
- number of records
- record length in bytes
- record length type: always FIXED LENGTH
- record length type code: always FIXD (fixed length)

3.1.3 Text Record

The text record is the last record in the volume directory file. It contains:
- the product identification
- the tape identification with the tape creation time.
- the scene identification with the time of acquisition at the scene center.

3.2 Quicklook File

3.2.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of record present in the quicklook file. The variable segment also contains quicklook look image parameter, record parameter, image description and image pixel data description.

3.2.2 Catalogue Information Record

This record contains all the information which will be recorded in the Catalogue system.

3.2.3 Quicklook Image Record

This record contains 1 line quicklook image (= 656 pixels)
The quicklook image recorded in L-2 product is the same as that of L-1 product.

3.3 Leader File

3.3.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of records present in the leader file:
- scene header record (1)
- ancillary records (always 19 fixed records)

There are no annotation records.
The locator fields supply the location and format of 8 important data fields within the leader file. Standard codes used for the locators are explained in the logical volume content description.

3.3.2 Scene Header Record

This record provides information about scene, mission, sensor, frame and processing parameters.
The scene parameters include:
- product identification ; this parameter represents the data correction status, such as calibrated or not, geophysically processed or not, location information contained or not.
- input scene identification ; this parameter represents the time (GMT) of the acquisition of the first scan line.
- location of scene center in latitude and longitude and in line and pixel in the line.
- time at the scene center (central scan line) expressed in year/ month/day/hour/minute/second/millisecond

The mission parameters contain fixed information about the mission plus a flag for ascending/descending path, and the time of ascending/descending node.

The sensor parameters contain the upper and lower limits expressed in nanometers, of the wavelengths sensed by the instrument. Gain value and tilt angle actually used for the processing of this scene are also contained.

The frame parameters contain the number of scene pixels per line and the number of scene lines.

The processing parameters indicate that CZCS Level-2 products are radiometrically calibrated, converted to geophysical parameters, but not geometrically corrected.

3.3.3 CRT Documentation Record

The content of this record is extracted from the Level-1 CRT documentation record put at the end of the CRTdata File. ILT(Image Location Tape) data are not contained.

3.3.4 ILT Record

There are 2 ILT records. The first one is extracted from the Level-1 CRT documentation record put at the top of the CRTdata File, while the second one is extracted from the Level-1 CRT documentation record put at the end of the CRTdata File.

3.3.5 Orbit & Attitude Data Record

This record provides ephemeris and attitude data during the observation period. Ephemeris data are state vector, greenwich hour angle from aries, sub satellite latitude/longitude, and altitude. Ephemeris data are given every one minute, and the maximum number of the ephemeris data set contained in this record is 3. Attitude data are given every 4 seconds, and the maximum number of the attitude data set is 31.

3.3.6 Radiometric Correction Parameter Record

This record provides the information about the radiometric correction parameters used for processing this scene.

Water/land/cloud discrimination parameters contain the threshold values to discriminate water/land/cloud pixels.

Radiometric calibration parameters contain the prelaunch calibration parameter values and the coefficients to correct the sensitivity decay of CZCS.

Atmospheric correction parameters consist of the common parameters, rayleigh correction parameters, aerosol correction parameters, case 1/case 2 water discrimination parameters and iteration calculation parameters.

Common parameters contain solar parameter values, atmospheric parameter values and water parameter values which are used for the whole Level-2 processing.

Rayleigh correction parameters contain the information of the rayleigh scattering correction method (algorithm).

Aerosol correction parameters contain the information about the equations and the coefficients values used for correction of the mie scattering effect caused by the aerosol particles.

Case 1/case 2 water discrimination parameters contain the coefficients values of the polynomial equations used for discrimination.

Iteration calculation parameters contain information about iteration calculation for correction of the aerosol particle effect. initial values, conversion criteria values and iteration limit numbers are contained.

Geophysical processing parameters contain the information about the equations and the coefficients values used for calculation of the pigment concentration, both for case 1 and case 2 water case.

3.3.7 Data Scale & Histogram Record

There are 12 data scale & histogram records for 12 bands of Level-2 image data. This record provides data scale parameters which are necessary to convert the binary values of the image to the geophysical values. Some statistical information and the histogram values of the image are also contained.

3.4 Imagery File

3.4.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of record present in the imagery file.

The 8-byte data locators indicate the location and format of 6 important data fields within the imagery file. The seventh byte specifies, for each locator, if the information is stored in the prefix (P) or the suffix (S) parts of the image record.

The variable segment also describes the LINN format for "pixel group data" (one pixel) in each band: 8 bit-pixels with a right-justified format.

3.4.2 Image Record

This record is composed of three parts:
- prefix data
- image data
- suffix data

Most of the prefix and suffix data are located by the file descriptor record variable segment for the imagery file. Prefix data give the current scan line and the acquisition station time. Calibration and location information for 77 anchor points is provided in the suffix.

3.5 Trailer File

3.5.1 File Descriptor Record

One trailer file is associated with each imagery file. The file descriptor record is composed of a fixed segment which contains standard information and a variable segment the number and length of each type of records present in the leader file. The quality indicator is constructed in the same way as in the leader file.

3.5.2 Trailer Record

This record contains quality information associated with the image, such as the number of sync losses, parity errors, and bit slip occurrences.

3.6 Null Volume Directory File

This volume contains only the volume descriptor record. The structure is the same as the volume descriptor record of the imagery volume.

4. Format description

4.1 Introduction

This chapter describes in details the records within each file of the logical volume. The order of the description follows the order in which the file appears on the tape. Each record is represented as a table consisting of seven columns:

col 1 - name of the field or of the field-group (defined in Annex 2)
col 2 - field-group indicator: 'blank' if single field
'*' if field-group
col 3 - starting byte of the field (or field-group)
col 4 - last byte of the field (or field-group)
col 5 - format in which the data of this field is written (described below)
col 6 - definition and explanation of the content of the field (or field-group)
col 7 - actual content of the field if it is a constant for an ESA/EPO product.

The format described in column 5 is standard Fortran. The main formats used in this product are:

xBn = x times data written in binary form on n bytes (unformatted);
xIn = x times data written as integer values formatted on n digits (e.g., 123 written as 1I4 is: " 123");
xFn.m = x times data written as real numbers on a total of n digits including dot and sign, with m digits for the decimal part (e.g., 123.456 written as 1F10.4 is: +123.4560");
xAn = x strings of n ASCII characters.

4.2 Record table

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
VOLUME_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
VOL_DOC_SEGM	*	17	44		Volume Documentation Segment	
9		17	28	A12	Superstructure control document number	CCB-CCT-0002
10		29	30	A2	Superstructure control document revision number	$F
11		31	32	A2	Superstructure record format revision letter <XX> (initially '$A',then '$B',etc...)	$A
12		33	44	A12	Software release number:NICZ-002-XXX initially XXX = 001,then 002,etc.	
VOL_IDE_SEGM	*	45	172		Volume Identification Segment	
13	**	45	60	A16	Physical Volume identification: <MNNS$YYDDDHHMM$$> M - Mission (=B for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of tape creation DDD- Day of tape creation HH - Hour of tape creation MM - Minute of tape creation	
14		61	76	A16	Logical Volume ID : <MNNS$YYDDDHHMM00>	NIMBUS7CZCS$L2
15		77	92	A16	Volume Set ID	$1
16		93	94	I2	Number of Physical Volumes in the Set	$1
17		95	96	I2	Physical Volume Number, Start of Logical Volume	$1
18		97	98	I2	Physical Volume Number, End of Logical Volume	$1
19		99	100	I2	Physical Volume sequence number (i.e. of current tape)	$$$1
20		101	104	I4	First Referenced File Number in this Physical Volume	$$$1
21		105	108	I4	Logical Volume Number within Volume Set	$$$1
22		109	112	I4	Logical Volume Number within Physical Volume	
23		113	120	A8	Logical Volume Creation Date <YYYYMMDD>	
24		121	128	A8	Logical Volume Creation Time <HHMMSSXX>	
25		129	140	A12	Logical Volume Generating Country	
26		141	148	A8	Logical Volume Generating Agency	
27		149	160	A12	Logical Volume Generating Facility	
28		161	164	I4	Number of Pointer Records in Volume Directory	$$$4
29		165	168	I4	Number of Records in Volume Directory	$$$6
30		169	172	I4	Number of Logical Volumes on this Physical Volume	$$$1

31	173	260	A88	Volume Descriptor Spare Segment	Blanks
32	261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
QUICKLOOK_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$1
10		21	36	A16	Referenced File Name	NI7$CZCS$Q/LLINN
11		37	64	A28	Referenced File Class	QUICKLOOK$FILE
12		65	68	A4	Referenced File Class Code	QUIC
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$325
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$$672
17		117	124	I8	Referenced File Maximum Record Length	$$$$$672
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
LEADER_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	3
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$2
10		21	36	A16	Referenced File Name	NI7$CZCSLEADLINN
11		37	64	A28	Referenced File Class	LEADER$FILE
12		65	68	A4	Referenced File Class Code	LEAD
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$$21
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$3800
17		117	124	I8	Referenced File Maximum Record Length	$$$$3800
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
IMAGERY_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1		B4	Record Sequence Number	4
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$3
10		21	36	A16	Referenced File Name	N17$CZCSIMOPLINN
11		37	64	A28	Referenced File Class	IMAGERY$FILE
12		65	68	A4	Referenced File Class Code	IMOP
13		69	96	A28	Referenced File Data Type	BINARY$ONLY
14		97	100	A4	Referenced File Data Type Code	BINO
15		101	108	I8	Number of Records in Referenced File (up to $$$$$971)	
16		109	116	I8	Referenced File - Descriptor Record Length	$$$25200
17		117	124	I8	Referenced File Maximum Record Length	$$$25200
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
TRAILER_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	5
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$4
10		21	36	A16	Referenced File Name	NI7$CZCSTRAILINN
11		37	64	A28	Referenced File Class	TRAILER$FILE
12		65	68	A4	Referenced File Class Code	TRAI
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$$$2
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$$360
17		117	124	I8	Referenced File Maximum Record Length	$$$$$360
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
TEXT_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	6
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	63
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC flag for this record	A$
8		15	16	A2	Continuation flag. This field contains two blanks unless the information of this record is continued on a following record, in which case, the field is coded C$.	$$
9		17	66	A50	Product identification: PRODUCT:NIMBUSNNCZCS$LINN$GEOPHYSICAL$VALUE$$$<CrLf> (for Level 2) PRODUCT:NIMBUSNNCZCS$CRT$$$$$$$$$$$$$$$$$$$$$$$$$<CrLf> (for Level 1)	
10		67	124	A58	Location, date and Time of product generation (ex.PROCESSED:$$ITALY$$$$$$$$ESA-EPOSON$YYYYMMDD$AT$HHMMSS$$<CrLf>	
11		125	148	A24	Tape ID TAPEID:$MNNS$YYDDDHHMM<CrLf>, where M - Mission, e.g. B for NIMBUS NN - Mission number, e.g. 07 for NIMBUS-7 S - Sensor ID, e.g. C for CZCS YY - Year of creation DDD- Day of creation HH - Hour of creation MM - Minute of creation	
12		149	178	A30	Scene Identification SCENE$$:$MNNS$YYDDDHHMMSSmmm<CrLf>, where M - Mission, e.g. B for NIMBUS NN - Mission number,e.g. 07 for NIMBUS-7 S - Sensor ID, e.g. C for CZCS YY - Year of scene acquisition DDD - Day of scene acquisition(001,...,366) HH - Hour of scene acquisition (00,...,23) MM - Minute of scene acquisition(00,...,59) SS - Second of scene acquisition(00,...,59) mmm - Milliseconds of scene acquisition (000,...,999)	
13		179	360	A182	Blanks	

IMAGERY_VOLUME
QUICKLOOK_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	63
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>,where XX='$A', etc.	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number NICZ-002-XXX, initially XXX=001,then 02,etc.	NICZ-002-001
13		45	48	I4	File Number	$$$1
14		49	64	A16	File Name	NI7$CZCSQ/L$LINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	668		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of Catalog Information Records	$$$$$1

30		187	192	I6	Number of Q/L Image Records	$$$323
31		193	198	I6	Catalog Information Record Length	$$$672
32		199	204	I6	Q/L Image Record Length	$$$672
33		205	232		Blanls	Blanks
QL_IMA_PAR	*	233	272		Q/L IMAGE PARAMETER	
34		233	236	I4	Number of bands of imagery in the Q/L image	$$$1
35		237	244	I8	Number of lines per Q/L image (one Q/L image record contains one line of Q/L image)	$$$323
36		245	248	I4	Number of left border pixels	$$$0
37		249	256	I8	Number of Q/L image pixels per line	$$$$$656
38		257	260	I4	Number of right border pixels	$$$0
39		261	264	I4	Number of top border lines	$$$0
40		265	268	I4	Number of bottom border lines	$$$0
41		269	272	A4	Interleaving indicator -n/a	
QL_REC_PAR	*	273	296		Q/L RECORD PARAMETER	
42		273	274	I2	Number of physical records per line	$1
43		275	276	I2	Number of physical records per multispectral line in the Q/L image records -n/a	$1
44		277	280	I4	Number of bytes of prefix data per record -n/a	
45		281	288	I8	Number of bytes of image data per Q/L image record	$$$$$656
46		289	292	I4	Number of bytes of suffix data per record -n/a	
47		293	296	I4	Prefix/suffix repeat flag -n/a	
48		297	464		Blanks	Blanks
QL_IMA_DESC	*	465	484		Q/L IMAGE DESCRIPTION	
49		465	468	I4	Number of bands per line	$$$1
					Q/L Image Pixel Group Data	
50		469	472	I4	Number of bits per pixel	$$$8
51		473	476	I4	Number of pixel per data group	$$$1
52		477	480	I4	Number of bytes per data group	$$$1
53		481	484	A4	Justification and order of pixels within data group	RJLR
QL_IMA_PXL_DESC	*	485	516		Q/L Image Pixel Data Description	
54		485	488	I4	Number of left fill bits within pixel	$$$0
55		489	492	I4	Number of right fill bits within pixel	$$$0
56		493	500	I8	Maximum data range of pixel values	$$$$$$64
57		501	508	A8	Left fill pixel bit data description -n/a	$$$$$$$$
58		509	516	A8	Right fill pixel bit data description -n/a	$$$$$$$$
59		517	672		Blanks	Blanks

IMAGERY_VOLUME
QUICKLOOK_FILE
CATALOG_INFORMATION_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	40
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
CAT_INFO_SEGM	*	17			Catalog Information Segment	
9		17	32	F16.8	Equator Crossing Longitude (degree ; 0 to 360 eastward)	
10		33	40	I8	Orbit Number	
11		41	46	A6	Aquisition Date (YYMMDD)	
12		47	52	A6	Equator Crossing Time (HHMMSS)	
13		53	58	A6	Image Start Time (HHMMSS)	
14		59	64	A6	Image Stop Time (HHMMSS)	
15		65	68	A4	Quicklook OK status Y$$$ = yes, N$$$ = no	
16		69	72	I4	Product Level ($$$2 = Level 2 product)	
17		73	88	A16	Station Code A2 & Scene name A14	
18		89	104	A16	Archived Optical Disk ID for this L-2 data	
19		105	120	A16	Archived Optical Disc ID for original L-1 data	
20		121	136	F16.8	NW Corner Latitude of Q/L Image (degree)	
21		137	152	F16.8	NW Corner Longitude of Q/L Image (degree ; 0 to 360 eastward)	
22		153	168	F16.8	SW Corner Latitude of Q/L Image (degree)	
23		169	184	F16.8	SW Corner Longitude of Q/L Image	
24		185	200	F16.8	SE Corner Latitude of Q/L Image (degree)	
25		201	216	F16.8	SE Corner Longitude of Q/L Image	
26		217	232	F16.8	NE Corner Latitude of Q/L Image (degree)	
27		233	248	F16.8	NE Corner Longitude of Q/L Image (degree ; 0 to 360 eastward)	
28		249	264	F16.8	Latitude of Q/L Image Center (degree)	
29		265	280	F16.8	Longitude of Q/L Image Center (degree ; 0 to 360 eastward)	
30		281	284	I4	Data Quality Flag (*)	
31		285	288	I4	Number of Bad or Missing Lines	
32		289	304	F16.8	Percentage of Water Pixels	
33		305	320	F16.8	Percentage of satured Water Pixels	
34		321	336	F16.8	Percentage of Case I Water Pixels	
35		337	352	F16.8	Percentage of Case II Water Pixels	
36		353	368	F16.8	Percentage of Water Pixels in NW Quadrant	
37		369	384	F16.8	Percentage of Water Pixels in SW Quadrant	

38	385	400	F16.8	Percentage of Water Pixels in SE Quadrant
39	401	416	F16.8	Percentage of Water Pixels in NE Quadrant
	417	432	F16.8	Percentage of Unprocessed Water Pixels
	433	448	F16.8	Angstrom exponent
	449	464	F16.8	Percentage of Unprocessed Water Pixels
42				in SE Quadrant (filled with 0.00000000)
	465	480	F16.8	Percentage of Unprocessed Water Pixels
43				in NE Quadrant (filled with 0.00000000)
44	481	496	F16.8	Tilt Angle of the CRT(degree)
45	497	500	I4	Gain value of the CRT($$$1,$$$2,$$$3 or $$$4)
46	501	516	F16.8	Sun Azimuth of Frame Center (degree)
47	517	532	F16.8	Sun Zenith of Frame Center (degree)
48	533	536	I4	Version number of the Level-2 processing
49	537	552	A16	Rayleigh Scattering Calculation Algorithm ID
50	553	568	A16	Sensitivity Loss Correction Algorithm ID
51	569	584	A16	Reflectance Model ID for Case I Water
52	585	600	A16	Reflectance Model ID for Case II Water
53	601	616	A16	Pigment Concentration Calculation Algorithm ID
				for Case I Water
54	617	632	A16	Pigment Concentration Calculation Algorithm ID
				for Case II Water
55	633	634	A2	TOMS ozone data used/not used flag
				Y$ = yes, N$ = no
56	635	636	A2	ECMWF preassure level data used/not used flag
				Y$ = yes, N$ = no
57	637	652	F16.8	Tilt Angle used for L-2 processing(degree)
58	653	656	I4	Gain value used for L-2 processing
				($$$1,$$$2,$$$3 or $$$4)
	657	660	I4	Water discrimination threshold (0 to 255)
	661	672	A12	To be used

IMAGERY_VOLUME
QUICKLOOK_FILE
QUICKLOOK_IMAGE_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	
2		5		B1	File Code (according to CEOS definition)	40
3		6		B1	Record Code (according to CEOS definition)	20
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
9		17	672	65681	Quicklook Image Data of 1 line (= 656 pixels)	

IMAGERY_VOLUME
LEADER_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>, (Initially '$A',then '$B',etc.)	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$2
14		49	64	A16	File Name	NI7$CZCSLEADLINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	N
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks

FDR_VARIA_SEGM	*	181	1800		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of scene header records	$$$$$1
30		187	192	I6	Header record length	$$3800
31		193	198	I6	Number of ancillary records	$$$$19
					1 CRT documentation record	
					2 ILT records	
					1 orbit & attitude data record	
					1 ozone optical thickness record	
					1 molecular scattering optical thickness record	
					1 radiometric correction parameter record	
					12 data scale and histogram records	
32		199	204	I6	Ancillary record length	$$3800
33		205	210	I6	Number of annotation records	$$$$$0
34		211	216	I6	Annotation Record length	$$$$$0
LOC_FIELDS	*	217	376		LOCATOR FIELDS	
					The locator fields point to the position in	
					the file where various information can be found	
					coded in 16 bytes ASCII :	
					Bytes 1- 6 = record number containing that field	
					Bytes 7-12 = byte position of the field within	
					the record	
					Bytes 13-15 = length of field in bytes	
					Byte 16 = type of data code	
					A for alphanumeric;	
					B for binary;	
					N for numeric.	
35		217	232	A16	Scene identification field locator	$$$$$2$$$197$16A
36		233	248	A16	Blanks (not used)	Blanks
37		249	264	A16	Mission identification field locator	$$$$$2$$$309$16A
38		265	280	A16	Sensor identification field locator	$$$$$2$$$325$16A
39		281	296	A16	Scene center date-time field locator	$$$$$2$$$117$32A
40		297	312	A16	Geographic reference field locator	$$$$$2$$$213$32N
41		313	328	A16	Image processing performed field locator	$$$$$2$$1573$16A
42		329	344	A16	Image Format Indicator locator	$$$$$2$$1717$16A
43		345	360	A16	Band indicator locator	$$$$$2$$1653$64A
44		361	376	A16	Blanks	Blanks
45		377	3800	A3424	Blanks	Blanks

IMAGERY_VOLUME
LEADER_FILE
SCENE_HEADER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	Header record sequence number	$$$1
8		17	20	A4	Blanks	$$$$
SCE_PAR	*	21	308		SCENE PARAMETERS	
9		21	36	A16	Product identification Product identification defoned as: CALED = Calibrated GPHY = Geophysically processrd GEO = Location information contained	CZ$CALED$GPH$GEO
10		37	52	A16	Input scene identification <SYYMMDDHHMMSSmmm> where: S=Sensor ID, i.e. C for CZCS YY - Year (1,...,99) MM - Month (1,...,12) DD - Day of Month (1,...,31) HH - Hour (0,...,23) MM - Minute (0,...,59) SS - Second (0,...,59) mmm - Millisecond (000,...,999) GMT at which the first scan was imaged	
11		53	68	F16.8	Input scene (frame) centre latitude in degrees	
12		69	84	F16.8	Input scene (frame) centre longitude in degrees	
13		85	100	A16	Line number at input scene centre	
14		101	116	A16	Pixel number at input scene centre	$$$$$$$$$$$$$988
15		117	148	A32	Input scene centre time <YYYYMMDDHHMMSSmmm>, followed by 15 blanks, where YYYY=year MM=month DD=day HH=hours (00 to 23) MM=minutes (00 to 59) SS=seconds (00 to 59) mmm=milliseconds (000 to 999)	
16		149	164	I16	Spare	
17		165	180	A16	Spare	
18		181	196	I16	Spare	
19		197	212	A16	The processed scene identifier is the same as the input scene identifier - same as field 10	

20		213	228	F16.8	Same as field 11	
21		229	244	F16.8	Same as field 12	
22		245	260	F16.8	Same as field 13	
23		261	276	F16.8	Same as field 14	
24		277	292	I16	Blanks	
25		293	308	I16	Blanks	
MIS_PAR	*	309	404		MISSION PARAMETERS	
26		309	324	A16	Mission identification	NIMBUS-7$$$$$$$$
27		325	340	A16	Sensor identification	CZCS$$$$$$$$$$$$$
28		341	356	I16	Orbit number	
29		357	372	A16	Ascending/descending flag ASCENDING$$$YYYY where YYYY - year of node	
30		373	388	F16.8	Ascending/descending node in degrees	
31		389	404	A16	Time of ascending/descending node <MMDDHHMMSSmmm> followed by 3 blanks, where MM = month DD = day HH = hour (00 to 23) MM = minutes (00 to 59) SS = seconds (00 to 59) mmm = milliseconds (000 to 999)	
SEN_PAR	*	405	1428		SENSOR PARAMETERS	
32		405	500	1218	Upper and lower limits of wavelength range in nanometers B1 [433-453], B2 [510-530], B3 [540-560] B4 [660-680], B5 [700-800], B6 [1050-1250]	
33		501	516	I16	Number of active bands in the processed image. The total number of active bands is n. All subsequent reference to band number is by "logical band number" where each of the active bands, in ascending order, is assigned a logical band number in the range 1 to n(12).	
34		517	524	I8	CZCS gain value used for for processing this scene ($$$$$$$1,$$$$$$$2,$$$$$$$3 or $$$$$$$4)	
35		525	532	I8	The status of the CZCS threshold function for this scene ($$$$$$$1 = off, $$$$$$$2 = on)	
36		533	548	F16.8	The tilt angle used for processing this scene	
37		549	1428		Blanks	
FRAME_PAR	*	1429	1476		FRAME PARAMETERS	
38		1429	1444	I16	Number of scene pixels per line in the processed image	$$$$$$$$$$$$1968
39		1445	1460	I16	Number of scene lines in the processed image This is the actual number of scene lines in the imagery file following this Leader file.	
40		1461	1476	A16	Spare	
PRO_PAR	*	1477	2020		PROCESSING PARAMETERS	
41		1477	1488	A12	Calibration designator Calibration status is indicated by any combination of the following bytes codes NONE : none PI : raw data with pre-flight calibration data	PC$SC$$$$$$$

				information PC : calibrated by pre-flight data SC : calibrated by post-flight sensitivity decay data	
42		1489	1504	I16	Spare
43		1505	1520	A16	Geophysical processing designator Geophysical processing status is indicated by any combination of the following bytes codes NONE : none RC : Rayleigh scattering effect corrected AC : Aerosol scattering effect corrected PC : Pigment concentration calculated	RCACPC$$$$$$$$
44		1521	1536	A16	Geometric correction designator NONE - none System corrections will be indicated by any combination of the following byte codes, preceded by the characters SYSTEM: E - Earth rotation correction P - Panoramic distortion & earth curvature correction L - Line length correction	NONE$$$$$$$$$$$$
45		1537	1552	A16	Resampling algorithm designator NONE - None NN - Nearest Neighbour CC - Cubic Convolution S8 - 8-points (sin x)/x DS8 - 8-points damped (sin x)/x S16 - 16-points (sin x)/x DS16 - 16-points damped (sin x)/x	NONE$$$$$$$$$$$$
46		1553	1568	A16	Map projection identifier NONE - none	NONE$$$$$$$$$$$$
47		1569	1584	A16	Product level indicator	LEVEL$2$$$$$$$$
48		1585	1600	I16	Number of Map Projection ancillary records	$$$$$$$$$$$$$$$0
49		1601	1616	I16	Number of GCP anc. records	$$$$$$$$$$$$$$$0
50		1617	1632	I16	Number of Orbit/Attitude anc. records 2 ILT records plus 1 orbit & attitude record	$$$$$$$$$$$$$$$3
51		1633	1648	I16	Number of all other records in Leader File Radiometric correction related records (optical thickness, radiometric correction parameter, data scale & histogram) and others (file descriptor, header, CRT documentation)	$$$$$$$$$$$$$$18
52		1649	1712	A64	Active bands One byte per band, maximum of 64 bands where the n'th byte is set to 1 if the band is active, and to 0 otherwise.	
53		1713	1728	A16	Interleaving indicator	LINN$$$$$$$$$$$$
54	*	1729	1744		Geographic ancillary information indicator (Y/N):	
54-1		1729		A1	Earth Location Data in Suffix	Y
54-2		1730		A1	Sun Angles in Suffix	Y
54-3		1731		A1	Satellite Angles in Suffix	Y
54-4		1732		A1	Latitude/Longitude grid in Pad bit #3 of Band 5	Y
54-5		1733		A1	Spare	
54-6		1734		A1	Spare	
54-7...16		1735	1744	A1	Blank	Blank

55	1745	1760	I16	Radiometric resolution designator of Band 1	$$$$$$$$$$$$$$8
56	1761	1776	I16	Radiometric resolution designator of Band 2	$$$$$$$$$$$$$$8
57	1777	1792	I16	Radiometric resolution designator of Band 3	$$$$$$$$$$$$$$8
58	1793	1808	I16	Radiometric resolution designator of Band 4	$$$$$$$$$$$$$$4
59	1809	1824	I16	Radiometric resolution designator of Band 5	$$$$$$$$$$$$$$8
60	1825	1840	I16	Radiometric resolution designator of Band 6	$$$$$$$$$$$$$$8
61	1841	1856	I16	Radiometric resolution designator of Band 7	$$$$$$$$$$$$$$8
62	1857	1872	I16	Radiometric resolution designator of Band 8	$$$$$$$$$$$$$$8
63	1873	1888	I16	Radiometric resolution designator of Band 9	$$$$$$$$$$$$$$8
64	1889	1904	I16	Radiometric resolution designator of Band 10	$$$$$$$$$$$$$$8
65	1905	1920	I16	Radiometric resolution designator of Band 11	$$$$$$$$$$$$$$8
66	1921	1936	I16	Radiometric resolution designator of Band 12	$$$$$$$$$$$$$$8
67	1937	1952	I16	Number of CRT documentation ancillary records	$$$$$$$$$$$$$$1
68	1953	1968	I16	Number of ozone optical thickness ancillary records	$$$$$$$$$$$$$$1
69	1969	1984	I16	Number of molecular scattering optical thickness ancillary records	$$$$$$$$$$$$$$1
70	1985	2000	I16	Number of radiometric correction parameter records	$$$$$$$$$$$$$$1
71	2001	2016	I16	Number of data scale & histogram records	$$$$$$$$$$$$$$12
72	2017	2020	I4	Version number of the processing of this scene	
73	2021	3800		Blanks	Blanks

IMAGERY_VOLUME
LEADER_FILE
CRT_DOCUMENTATION_RECORD

Field or Field Group Name		Start Byte	Last Byte	Format	Description and Explanation	Content *
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record sequence number	3
2		5		B1	File code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	11
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	CRT Documentation Record sequence number	$$$1
8		17	20	A4	Blanks	$$$$
CRT_DOC_SEGM	*	21	1560		CRT Documentation Segment	
9		21	22		Physical Record Number (MSB 12 bits;binary integer) and Spares(LSB 4 bits; set to 0)	
10		23			File Control (MSB 2 bits) Record I.D. (LSB 6 bits;binary integer) 1 = leading documentation file 2 = trailing documentation file	
11		24		B1	Valid Data Flag 0(all bits off) = data is invalid 255(all bits on) = data is valid	
12		25	27	3B1	Target Area Code	
13		28		B1	File Number contained in the tape according to NASA tape format	
14		29	32	B4	Tape Sequence Number contained in NASA Standard Header Record	
15		33	36	B4	Film Frame Number	
16		37	38	B2	Starting Year Number For example,1978	
17		39	40	B2	Starting GMT Day Number Starts at 1 on Jan.1 and increments by 1 for each day of the year (1 to 366)	
18		41	44	B4	Starting Time in Milliseconds GMT. This number is in milliseconds of the GMT,and for the start of the CRTT data file	
19		45	48	B4	Increment in Milliseconds from the start time of the segment to the last data scan of the segment.	
20		49	50	B2	Orbit Number	
21		51	52	B2	Number of Scans	
22		53	54	B2	Geodetec Latitude Center ranging from 0 at the south pole to 18000(180 deg.*100) at the north pole (LSB weight is 0.01 deg)	
23		55	56	B2	Longitude Center from 0 at the Greenwich Meridian eastward to 36000 (360 deg.*100) (LSB weight is 0.01 deg)	
24		57	58	B2	Geodetic Latitude of Corner(left of truck,first in time), with scaling identical to field 14.	

25	59	60	B2	Longitude of Corner (left of truck,first in time), with scaling identical to field 15.
26	61	62	B2	Geodetic Latitude of Corner(right of truck,first in time), with scaling identical to field 14.
27	63	64	B2	Longitude of Corner (right of truck,first in time), with scaling identical to field 15.
28	65	66	B2	Geodetic Latitude of Corner(left of truck,las. in time), with scaling identical to field 14.
29	67	68	B2	Longitude of Corner (left of truck,last in time) with scaling identical to field 15.
30	69	70	B2	Geodetic Latitude of Corner(right of truck,last in time), with scaling identical to field 14.
31	71	72	B2	Longitude of Corner (right of truck,last in time) with scaling identical to field 15.
32	73			ILT FLAGS Bit 1(MSB) 0 = at least one set of data not available 1 = all relevant data available Bit 2 1 = time corrections available Bit 3 1 = solar ephemeris available Bit 4 1 = data quality loss available Bit 5 1 = VIP data available Bit6-7 00 = spacecraft ephemeris not available 01 = spacecraft ephemeris predicteve 11 = spacecraft ephemeris definitive Bit 8 1 = rate coefficients available
33	74			Parameter Presence Code Bit 1(MSB) 1 = Ch.1 data is present 0 = Ch.1 data is absent Bit 2 1 = Ch.2 data is present 0 = Ch.2 data is absent Bit 3 1 = Ch.3 data is present 0 = Ch.3 data is absent Bit 4 1 = Ch.4 data is present 0 = Ch.4 data is absent Bit 5 1 = Ch.5 data is present 0 = Ch.5 data is absent Bit 6 1 = Ch.6 data is present 0 = Ch.6 data is absent Bit 7-8 Spare 0
34	75	76	B2	Number of Missing Scans
35	77	78	B2	Number of Scans Missing Ch.1 data
36	79	80	B2	Number of Scans Missing Ch.2 data
37	81	82	B2	Number of Scans Missing Ch.3 data
38	83	84	B2	Number of Scans Missing Cn.4 data
39	85	86	B2	Number of Scans Missing Ch.5 data
40	87	88	B2	Number of Scans Missing Ch.6.data
41	89		B1	Algorithm I.D.Number of Ch.1 Calibration
42	90		B1	Algorithm I.D.Number of Ch.2 Calibration
43	91		B1	Algorithm I.D.Number of Ch.3 Calibration
44	92		B1	Algorithm I.D.Number of Ch.4 Calibration
45	93		B1	Algorithm I.D.Number of Ch.5 Calibration
46	94		B1	Algorithm I.D.Number of Ch.6 Calibration
47	95		B1	Algorithm I.D.Number of Geographic Location

25	59	60	B2	Longitude of Corner (left of truck,first in time), with scaling identical to field 15.
26	61	62	B2	Geodetic Latitude of Corner(right of truck,first in time), with scaling identical to field 14.
27	63	64	B2	Longitude of Corner (right of truck,first in time), with scaling identical to field 15.
28	65	66	B2	Geodetic Latitude of Corner(left of truck,last in time), with scaling identical to field 14.
29	67	68	B2	Longitude of Corner (left of truck,last in time) with scaling identical to field 15.
30	69	70	B2	Geodetic Latitude of Corner(right of truck,last in time), with scaling identical to field 14.
31	71	72	B2	Longitude of Corner (right of truck,last in time) with scaling identical to field 15.
32	73			ILT FLAGS Bit 1(MSB) 0 = at least one set of data not available 1 = all relevant data available Bit 2 1 = time corrections available Bit 3 1 = solar ephemeris available Bit 4 1 = data quality loss available Bit 5 1 = VIP data available Bit6-7 00 = spacecraft ephemeris not available 01 = spacecraft ephemeris predicteve 11 = spacecraft ephemeris definitive Bit 8 1 = rate coefficients available
33	74			Parameter Presence Code Bit 1(MSB) 1 = Ch.1 data is present 0 = Ch.1 data is absent Bit 2 1 = Ch.2 data is present 0 = Ch.2 data is absent Bit 3 1 = Ch.3 data is present 0 = Ch.3 data is absent Bit 4 1 = Ch.4 data is present 0 = Ch.4 data is absent Bit 5 1 = Ch.5 data is present 0 = Ch.5 data is absent Bit 6 1 = Ch.6 data is present 0 = Ch.6 data is absent Bit 7-8 Spare 0
34	75	76	B2	Number of Missing Scans
35	77	78	B2	Number of Scans Missing Ch.1 data
36	79	80	B2	Number of Scans Missing Ch.2 data
37	81	82	B2	Number of Scans Missing Ch.3 data
38	83	84	B2	Number of Scans Missing Cn.4 data
39	85	86	B2	Number of Scans Missing Ch.5 data
40	87	88	B2	Number of Scans Missing Ch.6.data
41	89		B1	Algorithm I.D.Number of Ch.1 Calibration
42	90		B1	Algorithm I.D.Number of Ch.2 Calibration
43	91		B1	Algorithm I.D.Number of Ch.3 Calibration
44	92		B1	Algorithm I.D.Number of Ch.4 Calibration
45	93		B1	Algorithm I.D.Number of Ch.5 Calibration
46	94		B1	Algorithm I.D.Number of Ch.6 Calibration
47	95		B1	Algorithm I.D.Number of Geographic Location

48	96		B1	Undefined	
49	97	100	B4	Decom Run Number	
50	101	104	B4	Decom Reel Number	
51	105	106	B2	Number of HDT Sync Losses occered reading 2 minutes period of the HDT tape	
52	107	108	B2	Number of HDT Parity Errors detected on the HDT tape during the 2 minutes period.	
53	109	110	B2	Number of WBVT Sync Losses detected by the pre-processor during generation of 2 minutes period of HDT tape.	
54	111	112	B2	Number of WBVT Bit Slip Occurences detected by the pre-processor during generation of 2 minutes period of HDT tape.	
55	113	176	32B2	Sub-Commutated 32 Housekeeping Data,scaled with 8 fractional bits	
56	177			Spare	0
57	178			Base Plate Temperature Flag 0(all bits off) = baseplate temperature is a normal preset value 255(all bits on) = temperature is obtained from the ILT	
58	179	180	B2	Baseplate Temperature This data has a fractional part of 7 bits.	
59	181	716		Spares	Blanks
60	717		B1	CZCS gain setting A binary integer value of 1,2,3 or 4	
61	718		B1	CZCS Threshold Function Status 1 = off, 2 = on	
62	719	720	B2	CZCS Tilt Angle Two's complement integer,with LSB weight of 1/1000 deg.	
63	721	722	B2	The year(4 digit) associated with the geographic scene center.	
64	723	724	B2	Scene Center Day of Year (1 to 366)	
65	725	728	B4	The Milliseconds of Day associated with the geographic center of the scene(0 to 86399999)	
66	729	730	B2	Solar Elevation at the Geographic Scene Center Values range from -90 to +90 deg.,represented by two's complement integer,with LSB weight of 1/100 deg.	
67	731	732	B2	Solar Azimuth at the Geographic Scene Center Values range from 0 to 360 deg. Unsigned binary integer,with LSB weight 1/100 deg.	
68	733	738	3B2	The Spacecraft Attitude(Roll,Pitch and Yaw) at the Geographic SCENE Center. Values range from -32 to +32 deg.,represented by two's complement integer,with LSB weight of 1/1000 deg.	
69	739		B1	Tick Label Flag for the Top/Bottom Edges 1 = tick labels are latitude 2 = tick labels are longitude	
70	740		B1	Tick Label Flag for the Left/Right Edges 1 = tick labels are latitude 2 = tick labels are longitude	

71	741	742	B2	Latitude of Top Left Tick Label Values range from 0 deg. at the south pole to 180 deg. at the north pole. Unsigned binary integer,with LSB weight of 1/100 deg.
72	743	744	B2	Latitude of Top Right Tick Label
73	745	746	B2	Latitude of Bottom Left Tick Label
74	747	748	B2	Latitude of Bottom Right Tick Label
75	749	750	B2	Longitude of Left Top Tick Label Values range from 0 to 360 deg.eastward. Unsigned binary integer,with LSB weight of 1/100 deg.
76	751	752	B2	Longitude of Left Bottom Tick Label
77	753	754	B2	Longitude of Right Top Tick Label)
78	755	756	B2	Longitude of Right Bottom Tick Label
79	757		B1	Top Tick Increments in degrees between successive ticks on each edge of the scene. Values may be 1,2,4 or 8 deg. Unsigned binary integers,with LSB weight of 1 deg.
80	758		B1	Bottom Tick Increments
81	759		B1	Left Tick Increments
82	760		B1	Right Tick Increments
83	761	814	27B2	Top Tick Location Arrays The location of the first tick is specified relative to the left end of the edge; the location of succeeding tick is specified relative to the position of the preceeding tick. Values are unsigned binary integers,representing numbers of pixels.
84	815	868	27B2	Bottom Tick Location Arrays
85	869	922	27B2	Left Tick Location Arrays The location of the first tick is specified relative to the top end of the edge; the location of succeeding tick is specified relative to the position of the proceeding tick. Values are unsigned binary integers, representing numbers of scan lines.
86	923	976	27B2	Right Tick Location Arrays
87	977	984	2B4	Slope and Intercept of Ch.1 for the conversion of the ch.1 data to radiometric units (mw/cm**2-ster-um) Signed and 7 bits whole part and 24 bits fractional.
88	985	992	2B4	Spope and Intercept of Ch.2
89	993	1000	2B4	Slops and Intercept of Ch.3
90	1001	1008	2B4	Slope and Intercept of Ch.4
91	1009	1016	2B4	Slope and Intercept of Ch.5
92	1017	1024	2B4	Slope and Intercept of Ch.6
93	1025	1536	256B2	Temperature Conversion Table Contains the temperature in degrees Celsius for the corresponding count of ch.6 data. This data has 8 bits whole part and 8 bits fractional part.

94	1537	1540	2B2	Image Enhancement Slope and Intercept of Ch.1 for display purpose, represented by two's complement integers. LSB weights are 1/256 for slopes and 1/16 for intercepts.	
95	1541	1544	2B2	Image Enhancement Slope and Intercept of Ch.2	
96	1545	1548	2B2	Image Enhancement Slope and Intercept of Ch.3	
97	1549	1552	2B2	Image Enhancement Slope and Intercept of Ch.4	
98	1553	1556	2B2	Image Enhancement Slope and Intercept of Ch.5	
99	1557	1560	2B2	Image Enhancement Slope and Intercept of Ch.6	
100	1561	3800		Spares	Blanks

IMAGERY_VOLUME
LEADER_FILE
ILT_RECORD

Field or Field Group Name		Start Byte	Last Byte	Format	Description and Explanation	Content
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record sequence number (4 to 5)	
2		5		B1	File code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	41
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	CRT Documentation Record sequence number ($$$1 to $$$2)	
8		17	20	A4	Blanks	$$$$
ILT_TYPA_SEGM	*	21			CZCS ILT Type A Record	
9		21	22		Physical Record Number(MSB 12 bits) and Spares (set to 0)	
10		23			Record I.D. Bit 1(MSB)-2 File Status Bit Bit 3-8 01 = Type A data record 02 = Data quality loss record 03 = Type A dummy record 11 = Tppe B data record(SOBV/TOMS) 13 = Type B dummy record 06 = Type D data record(SAM II) 31 = Time correction record	
11		24	26	B3	Data Orbit Number	
12		27		B1	GMT Year (last 2 digits only) corresponding to the data contained in item 17 thru 29	
13		28	29	B2	GMT Start Time of Year expressed in units of 2 hours(1/12 of a day) corresponding the data contained in item 17 thru 29	
14		30	32	B3	GMT Start Milliseconds of 1/12 day corresponding the data contained in item 17 thru 29	
15		33	35	B3	Spacecraft Time given in 1/12 days to be added to spacecraft time to get the corresponding spacecraft time for the associated data in item 17 thru 29. (MSB will be used as the sign bit)	
16		36	38	B3	Spacecraft Clock Time in milliseconds to be added to spacecraft 1/12 days above to get the corresponding time for the associated data in item 17 thru 29. (MSB will be used as the sign bit)	
17		39	41	B3	X co-ordinate of spacecraft location (in earth centered inertial co-ordinates true of date) Expressed in meters.	
18		42	44	B3	Y co-ordinate of spacecraft location	
19		45	47	B3	Z co-ordinate of spacecraft location	
20		48	50	B3	Greenwich Hour Angle from Aries	

				The angle between the inertial X-axis and the earth fixed x-axis,expressed in 10^{-6} radians.
21	51	53	B3	The X-component of the spacecraft velocity in km/second scaled by 2^{18}. The MSB will be used as the sign bit.
22	54	56	B3	The Y-component of the spacecraft velocity
23	57	59	B3	The Z-component of the spacecraft velocity If S/C ephemeris data is not available,each 24bits of items 17 thru 23 will be left at its initial value of 5777777_8.
24	60	65	B6	Sun Right Ascension(Azimuth) The angle measured in the plane of the equator from vernal equinox to a plane normal to the equator containing the sun(true of date) and positive counterclockwise as seen from +Z(north pole). Expressed as two 24 bit words. The first 24 bits(X1) will be radians scaled by 221. The second 24 bit(x2) word will be radians scaled by 229. To get 29 bit precision, Y let Y = X1+x2 if X1>0 ; Y = X1-X2 if X1<0 If solar ephemeris data is not available, each 24 bits is left at its initial value=5777777_8
25	66	71	B6	Sun Declination(Elevation) The angle between the sun and the inertial equator measureed in a plane normal to the inertial equator containing the sun and the earth center (true of date), positive above equator. Same scaling as item 107. If solar ephemeris data is not available, each 24 bits is left at its initial value = 5777777_8
26	72	74	B3	Sub-satellite Longitude East longitude of normal from spacecraft to ellipsoid,expressed in 10^{-6} radians. Equatorial radius = 6378.144km Polar radius = 6356.759km
27	75	77	B3	Sub-satellite Geocentric Latitude
28	78	80	B3	Altitude The distance from the spacecraft to ellipsoid measured along the normal,expressed in meters. If S/C ephemeris is not available, each 24 bits of item 26 thru 28 is left at its initial value = 5777777_8.
29	81	83	B3	Spacecraft Day/Twilight/Night Status 0 = Day (Spacecraft & subtract point both illuminated 1 = Twilight (Spacecraft illuminated,sabtract point in shade) 2 = Night (Spacecraft & Subtract point both in shade)
30	84	128		Repeat of item 17 to 29 for 60 GMT seconds

				after the GMT given in item 12 thru 14.	
31		128	173		Repeat of item 17 to 29 for 120 GMT seconds after the GMT given in item 12 thru 14,but only if 3 minutes of ephemeris data coincide with the 2 minutes 8 secondstime period contained in this record. Otherwise, each 24 bits will be 5777777_8.
32		174	176	B3	GMT(MS) of Start of First VIP Major Frame This is given as increment in milliseconds from the time given in item 12-14. This number will always negative except when ILT data record starts exactly on the GMT integer minutes. It may cause the day count to change.
33		177	179	B3	Spacecraft Time(1/12 Days) of Start of First VIP Major Frame to be added to the next 24-bit word (item 34). This may be negative and may cause the day count to change.
34		180	182	B3	Spacecraft Time(MS) of Start of First VIP Major Frame to be added to the item 33. This provides the start time of data which follows in item 35 thru 47. If this word is negative,no VIP data was available. The MSB will be used as the sign bit.
35		183	202		VIP Major Frame Q/C
36		203			Spare 11111111_2
37		204	227		Sensor-Spacecraft Status
38		228	239		THIR Housekeeping Data
39		240	244		LIMS Housekeeping Data
40		245		B1	CZCS Baseline Temperature The value is in raw counts
41		246	248		Spacecraft Pitch Bit 1(MSB)-2 ; source code 00 = ACS data only 01 = ACS and DSAS data 10 = No ACS data(No VIP Data) In this case,entire 24 bits are set to 5777777_8. 11 = Pitch bias inserted Bit 3-24 ; Signed binary integer radian value multiplied by 10^6.
42		249	251		Spacecraft Yaw
43		252	254		Spacecraft Roll
44		255	257		Spacecraft Pitch Rate Bit 1(MSB)-2 ; 00 = Normal Computation 01 = Not Computed because of gating 11 = Not computed because CZCS turned on or off about this time. 10 = Not computed because no ACS data was available Bit 3-24 ; Rate of change of S/C pitch. Signed binary integer radians per second multiplied by 10^6.

45	258	260		Spacecraft Roll Rate
46	261	263	B3	DSAS Declination to Sun (Azimuth Angle) Tenth-of-degrees relative to the S/C axes,and ranges from -1800 to 1800 with negative values for sun directions to the left of S/C track(-Y hemisphere). The azimuth angle is zero when sun direction is aligned with S/C XZ-plane. Set to 5777777_8 if no data is available.
47	264	266	B3	DSAS Declination to Sun (Elevation Angle) Tenth-of-degrees relative to the S/C axes,and range from -1800 to 1800 with positive values corresponding to sun directions below the S/C XY-plane(+Z hemisphere). Set to 5777777_8 if no data is available.
48	267	581		15 additional sets of item 41 thru 47 for a total of 16 sets. Each set is for 1 spacecraft second after previous set(next second).
49	582	3416		7 additional sets of items 33 thru 48 for a total of 8 sets for 2 min.8 sec of coverage.
50	3417	3419	B3	Start Data Quality Loss Time The start time of an interval contained in this 2 min.8 sec period,where data quality loss has occurred,expressed as a GMT(milliseconds) increment from time given in item 32. The value should be multiples of 40 milliseconds.
51	3420	3422	B3	End Data Quality Loss Time The end time(milliseconds increment from time in item 32) of the data quality loss interval descrived above.
52	3423	3788		61 additional pairs of data quality loss intervals as descrived in item 50 and 51. Filled with 24 bit word 5777777_8 if no more intervals)
53	3789	3791		Data Quality Loss IntervalCount,and Next Record Flag Bit1(MSB)-12 ; Integer value indicating number of valid bit slip intervals in this record.(binary integer) Bit13-24 ; Next Data Flag
54	3792	3794		Input Data Flags giving the information about the six sources of input data used to generate this record. Bit1(MSB)-2 ; Time Corrections 00 - No, 01 - Yes Bit 3-4 ; Solar Ephemeris 00 - No, 01 - Yes Bit 5-6 ; Data Quality Loss Information 00 - No, 01 - Yes Bit 7-8 ; UFO-ILT(VIP data & SAM II data) 00 - No, 01 - Yes Bit 9-10 ; Spacecraft Ephemeris 00 - No, 01 - Predictive, 11 - Definitive Bit 11-12 ; Rate Coefficients 00 - No, 01 = Yes

55	3795	3797	Stripper Information Flag
56	3798	3800	CHECKSUM Result of adding all previous 24 bit words together.

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 6

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	13
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	536		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$3
10		23	24	A2	Blanks	
11		25	536	25682	Temperature conversion table Contains the temperature in degree Celsius for the corresponding count of Ch.6 data. This data has 8 bits whole and 8 bits fractional part.	
HIST_DAT_SEGM	*	537	1560		HISTOGRAM DATA SEGMENT	
12		537	1560	25684	Histogram value of Ch.6 (from level 0 to level 255)	
13		1561	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 5

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	12
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	60		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	56	2E16.8	Slope and intercept for conversion of the data value to reflectance	
12		57	60	I4	Threshold data value to distinguish land and cloud area	
HIST_DAT_SEGM	*	61	124		HISTOGRAM DATA SEGMENT	
13		61	124	1684	Histogram value of Ch.5 (from level 0 to level 15)	
14		125	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD (1 to 4)

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number(8 to 11)	
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number ($$$1 to $$$4)	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	80		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	56	2E16.8	Slope and intercept for conversion of the data value to the rayleigh corrected reflectance	
12		57	64	I8	Number of water pixels	
13		65	80	F16.8	Percentage of water pixels	
14		81	88	I8	Number of satured water pixels	
15		89	104	F16.8	Percentage of satured water pixels	
					HISTOGRAM DATA SEGMENT	
14		105	1128	25684	Histogram value of Ch.i (i ; 1 to 4) water pixels (from level 0 to level 255)	
15		1129	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
RADIOMETRIC_CORRECTION_PARAMETER_RECORD

field or field_group name	start byte	stop byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM *	1	20		RECORD IDENTIFICATION SEGMENT	
1	1	4	B4	Record Sequence Number	9
2	5		B1	File Code (according to CEOS definition)	10
3	6		B1	Record Code (according to CEOS definition)	60
4	7		B1	Mission Code (according to CEOS definition)	22
5	8		B1	Origin Code (according to CEOS definition)	50
6	9	12	B4	Length of this record	3800
7	13	16	I4	Radiometric Correction Parameter Record sequence number	$$$1
8	17	20	A4	Blanks	$$$$
W/L/C_DISC_PAR*	21	24		WATER/LAND/CLOUD DISCRIMINATION PARAMETER	
9	21		B1	Threshold value of channel 5 for indetifying water pixels	
10	22		B1	Threshold value of channel 5 for discrimination of land and cloud	
11	23		B1	Threshold value of channel 4 water pixels saturation	
12	24		A1	Blank	
RAD_PAR *	25	756		RADIOMETRIC CALIBRATION PARAMETER	
CAL_PAR *	25	248		CALIBRATION PARAMETER	
13 .	25	56	A32	Parameter Identification	
14	57	88	2F16.8	Slope and intercept of ch.1 (in mw/cm^2-ster-μm)	
15	89	120	2F16.8	Slope and intercept of ch.2	
16	121	152	2F16.8	Slope and intercept of ch.3	
17	153	184	2F16.8	Slope and intercept of ch.4	
18	185	216	2F16.8	Slope and intercept of ch.5	
19	217	248	2F16.8	Slope and intercept of ch.6	
ADJ_PAR *	249	344		ADJUST PARAMETER	
20	337	340	I4	Tilt	
21	341	344	I4	Gain	
SEN_DEC_PAR *	345	756		SENSITIVITY DECAY PARAMETER	
22	345	376	A32	Sensitivity decay model type	
23	377	436	A60	Description of the function	
24	437	496	A60	Description of the variable	
25	497	528	2E16.8	Coefficient C_a, C_b of ch.1	
26	429	560	2E16.8	Coefficient C_a, C_b of ch.2	
27	461	592	2E16.8	Coefficient C_a, C_b of ch.3	
28	593	624	2E16.8	Coefficient C_a, C_b of ch.4	
29	625	756		Blanks	
ATM_COR_PAR *	757	3388		ATMOSPHERIC CORRECTION PARAMETER	
COM_PAR *	757	1128		COMMON PARAMETER	
30	757	772	F16.8	Mean extraterrestial solar irradiance of ch.1 (in mw/cm^2-ster-μm)	
31	773	788	F16.8	Mean extraterrestial solar irradiance of ch.2 (in mw/cm^2-ster-μm)	

32	789	804	F16.8	Mean extraterrestial solar irradiance of ch.3 (in mw/cm^2-ster-μm)
33	805	820	F16.8	Mean extraterrestial solar irradiance of ch.4 (in mw/cm^2-ster-μm)
34	821	836	F16.8	Eccentricity of the Earth's orbit
35	837	838	I2	Rayleigh optical thickness calculation flag $1 = ECMWF pressure data present and used for processing $2 = ECMWF pressure data present but not used for processing $3 = ECMWF pressure data not present
36	839	840	I2	Ozone optical thickness calculation flag $1 = TOMS ozone data present and used for processing $2 = TOMS ozone data present but not used for processing $3 = TOMS ozone data not present
37	841	856	F16.8	Rayleigh optical thickness of ch.1 at P=1013.3hPa
38	857	872	F16.8	Rayleigh optical thickness of ch.2 at P=1013.3hPa
39	873	888	F16.8	Rayleigh optical thickness of ch.3 at P=1013.3hPa
40	889	904	F16.8	Rayleigh optical thickness of ch.4 at P=1013.3hPa
41	905	920	F16.8	Gasabsorbtion of ch.1 (not Ozone)
42	921	936	F16.8	Gasabsorbtion of ch.2 (not Ozone)
43	937	952	F16.8	Gasabsorbtion of ch.3 (not Ozone)
44	953	968	F16.8	Gasabsorbtion of ch.4 (not Ozone)
45	969	984	F16.8	Ozone optical thickness of ch.1 at 340 matm cm
46	985	1000	F16.8	Ozone optical thickness of ch.2 at 340 matm cm
47	1001	1016	F16.8	Ozone optical thickness of ch.3 at 340 matm cm
48	1017	1032	F16.8	Ozone optical thickness of ch.4 at 340 matm cm
49	1033	1048	F16.8	Refractive index of water of ch.1
50	1049	1064	F16.8	Refractive index of water of ch.2
51	1065	1080	F16.8	Refractive index of water of ch.3
52	1081	1096	F16.8	Refractive index of water of ch.4
53	1097	1112	F16.8	Ratio of upwelling irradiance to radiance
54	1113	1128	F16.8	Fresnel coefficient of the sea surface averaged over all angles
RAY_COR_PAR *	1129	1164		RAYLEIGH CORRECTION PARAMETER
55	1129	1160	A32	Rayleigh correction type
56	1161	1162	I2	Correction method indicator $1 = single scattering correction $2 = multiple scattering correction $3 = special
57	1163	1164	A2	Blanks
REF_MOD_PAR *	1165			REFLECTANCE MODEL PARAMETER
58	1165	1196	A32	Aerosol correction algorithm type
59	1197	1260	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_1)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
60	1261	1324	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_2)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
61	1325	1388	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_3)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
62	1389	1452	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_4)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
63	1453	1516	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_1)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
64	1516	1580	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_2)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
65	1581	1644	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_3)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$

66	1645	1708	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_4)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
67	1709	1724	F16.8	Threshold value of the pigment concentration (mg/m^3) for use of the ratio of $R(\lambda_2)$ to $R(\lambda_3)$ In case of no use of $R(\lambda_2) / R(\lambda_3)$ equations, set to 100.0
68	1725	1784	A60	Description of the function which calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
69	1785	1844	A60	Description of the variable for case II water where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
70	1845	1846	I2	Index to the band to be used to calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
71	1847	1878	2F16.8	Two coefficients α and γ where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
72	1879	1938	A60	Description of the function which calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
73	1939	1998	A60	Description of the variable for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
74	1999	2000	I2	Index to the band to be used to calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
75	2001	2032	2F16.8	Two coefficients α and γ for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
76	2033	2048	F16.8	Threshold value of $R(\lambda_1)$ for use of ratio $R(\lambda_2) / R(\lambda_3)$ In case of no use of $R(\lambda_2) / R(\lambda_3)$ equations, set to 100.0
77	2049	3000		Blanks
WAT_DESC_PAR *	3001	3144		CASE I AND CASE II WATER DISCRIMINATION PARAMETER
78 *	3001	3064	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln \lim R(\lambda_3)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
79	3065	3128	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln \lim R(\lambda_3)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
80	3129	3144	F16.8	Threshold value of the pigment concentration (mg/m^3) for use of the ratio of $R(\lambda_2)$ to $R(\lambda_3)$ In case of no use of $R(\lambda_2) / R(\lambda_3)$ equations, set to 100.0
ITER_CALC_PAR *	3145	3216		ITERATION CALCULATION PARAMETER
81	3145	3160	F16.8	Initial value of Angstrom exponent
82	3161	3176	F16.8	Initial value of $R(\lambda_4)$
83	3177	3192	F16.8	Acceptance criteria of convergence of Angstrom exponent calculation δ_v
84	3193	3196	I4	Iteration limit number of Angstrom exponent calculation
85	3197	3212	F16.8	Acceptance criteria of convergence of $R((\lambda_4)$ calculation $\delta R(\lambda_4)$
86	3213	3216	I4	Iteration limit number of $R(\lambda_4)$ calculation
GEO_PROC_PAR *	3217	3656		GEOPHYSICAL PROCESSING PARAMETER
87	3217	3248	A32	Case I water pigment concentration derivation algorithm type
88	3249	3312	4F16.8	4 coefficients of polynomial equation for derivation of pigment concentration case I water $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln C$, C: pigment concentration (mg/m^3), $X = \ln (R(\lambda_1) / R(\lambda_3))$
89	3313	3376	4F16.8	4 coefficients of polynomial equation for derivation of pigment concentration case I water $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln C$, C: pigment concentration (mg/m^3), $X = \ln (R(\lambda_2) / R(\lambda_3))$
90	3377	3408	A32	Case II water pigment concentration derivation algorithm type
91	3409	3468	A60	Description of the function
92	3469	3528	A60	Description of the parameter

93	3529	3592	4F16.8	4 coefficients for derivation of pigment concentration for case II water using ration ($R(\lambda_1) / R(\lambda_3)$)
94	3593	3656	4F16.8	4 coefficients for derivation of pigment concentration for case II water using ratio ($R(\lambda_2) / R(\lambda_3)$)
95	3657	3800		Blanks

IMAGERY_VOLUME
LEADER_FILE
ORBIT_AND_ATTITUDE_DATA_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record sequence number	6
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	40
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Record length	3800
7		13	16	I4	Orbit /Attitude ancillary record sequence number	$$$1
8		17	20	A4	Blanks	Blanks
9		21	24	I4	Number of ephemeris data sets (up to $$$3)	
10		25	28	I4	Number of attitude data sets (up to $$31)	
11	*	29	32		Flag indicating valid information of this record	
12		29		A1	$ or 1 if S/C ephemeris is available or not S/C ephemeris:S/C location,Greenwich hour angle from aries,S/C velocity sub satellite latitude and longitude,altitude	
13		30		A1	$ or 1 if solar ephemeris is available or not solar ephemeris:sun azimuth, sun elevation	
14		31		A1	$ or 1 if attitude data is available or not	
15		32		A1	$ or 1 if attitude rate data is available or not	
16		33	40	I8	Orbit number	
17		41	56	I16	Epoch year and day of year (YYYYDDD)	
EPHE DAT SEGM	*				Ephemeris Data Segment 1	
18		57	72	I16	Epoch time within day(msec)	
19		73	88	F16.8	X-position component(km)	
20		89	104	F16.8	Y-position component(km)	
21		105	120	F16.8	Z-position component(km)	
22		121	136	F16.8	X-velocity component(km/sec)	
23		137	152	F16.8	Y-velocity component(km/sec)	
24		153	168	F16.8	Z-velocity component(km/sec)	
25		169	184	F16.8	Greenwich hour angle from Aries (degrees)	
26		185	200	F16.8	Sub satellite latitude in degrees	
27		201	216	F16.8	Sub satellite longitude in degrees	
28		217	232	F16.8	Altitude(km)	
EPHE DAT SEGM	*	233	408		Ephemeris Data Segment 2	
EPHE DAT SEGM	*	409	584		Ephemeris Data Segment 3	
					Ephemeris data is given every one minutes	
ATTI DAT SEGM	*	585	680		Attitude Data Segment 1	
29		585	600	I16	Epoch time within day (msec)	
30		601	616	F16.8	Pitch (degree)	
31		617	632	F16.8	Yaw (degree)	
32		633	648	F16.8	Roll (degree)	

33		649	664	F16.8	Pitch rate (degree/sec)
34		665	680	F16.8	Roll rate (degree/sec)
ATTI DAT SEGM	*	681	3560		Attitude Data Segment 2 to 31
					Attitude data is given every 4 seconds
35		3561	3800		Blanks

Blanks

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD (7 to 9)

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number(14 to 16)	
2		5		B1	File Code	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
		13	16	I4	Data scale and histogram record sequence number ($$$1 to $$$3)	
7		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	128		DATA SCALE SEGMENT	
8		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
9		23	24	A2	Blanks	
10		25	56	2E16.8	Slope and intercept for conversion of the data value to the water leaving reflectance	
11		57	64	I8	Number of case I water pixels	
12		65	80	F16.8	Percentage of case I water pixels	
13		81	88	I8	Number of case II water pixels	
14		89	104	F16.8	Percentage of case II water pixels	
15		105	112	I8	Number of unprocessable water pixels (band 4 data saturation, unconvergence of iteration calculation, etc.)	
16		113	128	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	129	1152		HISTOGRAM DATA SEGMENT	
17		129	1152	25684	Histogram value of Ch.i (i ; 7 to 9) water pixels (from level 0 to level 255)	
18		1153	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 10

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	17
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8					($$$1 to $$$4)	
9		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21			DATA SCALE SEGMENT	
10		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
11		23	24	A2	Blanks	
12		25	56	2E16.8	Slope and intercept for conversion of the data value to the erosol reflectance for case I water	
13		57	64	I8	Number of case I water pixels	
14		65	80	F16.8	Percentage of case I water pixels	
15		81	88	I8	Number of unprocessable water pixels	
16		89	104	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	185	1128		HISTOGRAM DATA SEGMENT	
17		105	1128	25684	Histogram value of Ch.10 case I water pixels (from level 0 to level 255)	
18		1129	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 11

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	18
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	88		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	40	2E16.8	Slope and intercept for conversion of the data value to the angstrom exponent for case I water	
12		41	48	I8	Number of case I water pixels	
13		49	64	F16.8	Percentage of case I water pixels	
14		65	72	I8	Number of unprocessable water pixels	
15		73	88	F16.8	Percentage of unprocessable pixels	
HIST_DAT_SEGM	*	89	1112		HISTOGRAM DATA SEGMENT	
16		89	1112	25684	Histogram value of Ch.11 for case one water pixels (from level 0 to level 255)	
17		1113	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 12

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	19
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	164		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$2
10		23	24	A2	Blanks	
11		25	56	2F16.8	2 coefficients of the equation 1 C = exp((DN-a1)/a2) where C : pigment concentration(mg/m3) DN : data value of band 12	
12		57	88	2F16.8	2 coefficients of the equation 2 C = exp((DN-a1)/a2) where C : pigment concentration(mg/m3) DN : data value of band 12	
13		89	92	I4	Threshold value of DN to use equation 2 (If DN is larger(smaller) than this threshold value, equation 2(1) must be used to calculate C from DN)	
14		93	100	I8	Number of case I water pixels	
15		101	116	F16.8	Percentage of case I water pixels	
16		117	124	I8	Number of case II water pixels	
17		125	140	F16.8	Percentage of case II water pixels	
18		141	148	I8	Number of unprocessable water pixels (band 4 data saturation, unconvergence of iteration calculation, etc.)	
19		149	164	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	165	1188		HISTOGRAM DATA SEGMENT	
20		165	1188	25684	Histogram value of Ch.12 for water pixels (from level 0 to level 255)	
21		1189	3800		Blanks	

Radiometric Correction Parameter Record.

RAD_CAL_PAR - Identifies the Radiometric Calibration Parameters Segment in the Radiometric Correction Parameter Record.

PRE_CAL_PAR - Identifies the Prelaunch Calibration Parameters Segment in the Radiometric Correction Parameter Record.

ADJ_PAR - Identifies the Adjust Parameters Segment in the Radiometric Correction Parameter Record.

SEN_DEC_PAR - Identifies the Sensitivity Decay Parameters Segment in the Radiometric Correction Parameter Record.

ATM_COR_PAR - Identifies the Atmospheric Correction Parameters Segment in the Radiometric Correction Parameter Record.

COM_PAR - Identifies the Common Parameters Segment in the Radiometric Correction Parameter Record.

RAY_COR_PAR - Identifies the Rayleigh Correction Parameters Segment in the Radiometric Correction Parameter Record.

AER_COR_PAR - Identifies the Aerosol Correction Parameters Segment in the Radiometric Correction Parameter Record.

WAT_DESC_PAR - Identifies the Case 1 and Case 2 Water Discrimination Parameters in the Radiometric Correction Parameter Record.

ITER_CALC_PAR - Identifies the Iteration Calculation Parameters Segment in the Radiometric Correction Parameter Record.

GEO_PROC_PAR - Identifies the Geophysical Processing Parameters Record in the Radiometric Correction Parameter Record.

DAT_SCA_SEGM - Identifies the Data Scale Segment in the Data Scale and Histogram Record.

HIST_DAT_SEGM - Identifies the Histogram Data Segment in the Data Scale and Histogram Record.

PIX_PAR - Identifies the Pixel Group Parameters Segment in the File Descriptor Record of the Imagery File.

IMA_PAR - Identifies the Image Parameters Segment in the File Descriptor Record of the Imagery File.

REC_PAR - The same for the Record Parameters Segments.

LOC_FIELDS - The Prefix/Suffix Locators Fields Segment appear in the File Descriptor Record of the Imagery File.

DATA_DESC - Identifies the Pixel Data Description Segment in the File Descriptor Record.

LINN_DESC - LINN Description appear in the File Descriptor Record of the Imagery File.

PRE_DATA - Identifies the Prefix Data Segment in the

Image Record.

IMA_DATA - Identifies the Image Data Segment in the Image Record.

SUF_DATA - The same for the Suffix Data Segment.

TRA_DATA - Identifies the Trailer Data Segment in the Trailer Records.

IMAGERY_VOLUME
TRAILER_FILE
TRAILER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	90
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	16	I4	Trailer record sequence number	$$$1
8		17	20	A4	Blanks	Blanks
TRA_DATA	*	21	360		TRAILER DATA:	
9		21	28	I8	Number of HDT sync losses	
10		29	36	I8	Number of HDT parity errors	
11		37	44	I8	Number of WBVT sync losses	
12		45	52	I8	Number of WBVT bit slip occurrences	
13		53	360		Blanks	

NULL_VOLUME
VOLUME_DIRECTORY_FILE
VOLUME_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
VOL_DOC_SEGM	*	17	44		Volume Documentation Segment	
9		17	28	A12	Superstructure control document number	CCB-CCT-0002
10		29	30	A2	Superstructure control document revision number	$F
11		31	32	A2	Superstructure record format revision letter <XX> (initially '$A',then '$B',etc...)	$A
12		33	44	A12	Software release number:NICZ-002-XXX initially XXX=001,then 002,etc.	
VOL_IDE_SEGM	*	45	172		Volume Identification Segment	
13		45	60	A16	Physical Volume identification:<MNNS$YYDDDHHMM$$> M - Mission (=8 for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of tape creation DDD - Day of tape creation HH - Hour of tape creation MM - Minutes of tape creation	
14		61	76	A16	Logical Volume identification:<MNNS$YYDDDHHMM00> M - Mission (=8 for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of center frame acquisition DDD - Day of center frame acquisition HH - Hour of center frame acquisition MM - Minutes of center frame acquisition	Blanks
15		77	92	A16	Volume Set ID	NIMBUS7CZCS$L2
16		93	94	I2	Number of Physical Volumes in the Set	$1
17		95	96	I2	Physical Volume Number, Start of Logical Volume	$1
18		97	98	I2	Physical Volume Number, End of Logical Volume	$1
19		99	100	I2	Physical Volume sequence number (i.e. of current tape)	$1
20		101	104	I4	First Referenced File Number in this Physical Volume	$$$1
21		105	108	I4	Logical Volume Number within Volume Set	$$$1
22		109	112	I4	Logical Volume Number within Physical Volume	$$$1
23		113	120	A8	Logical Volume Creation Date <YYYYMMDD>	Blanks
24		121	128	A8	Logical Volume Creation Time <HHMMSSXX>	Blanks

25	129	140	A12	Logical Volume Generating Country	Blanks
26	141	148	A8	Logical Volume Generating Agency	Blanks
27	149	160	A12	Logical Volume Generating Facility	Blanks
28	161	164	I4	Number of Pointer Records in Volume Directory	Blanks
29	165	168	I4	Number of Records in Volume Directory	Blanks
30	169	172	I4	Number of Logical Volumes on this Physical Volume	Blanks
31	173	260	A88	Volume Descriptor Spare Segment	Blanks
32	261	360	A100	Local Use Segment	Blanks

5 ANNEXES

5.1 CEOS codes

5.1.1 Superstructure record types

The Committee on Earth Observation Satellites(CEOS) has suggested the following codes for the different record types (they are all in decimal):

	CEOS file	CEOS record	CEOS mission	CEOS origin
VOLUME DESCRIPTOR	192	192	18	18
NULL VOLUME DESCRIPTOR	192	192	63	18
FILE POINTER	219	192	18	18
FILE DESCRIPTOR	63	192	18	18
TEXT RECORD	18	63	18	18

5.1.2 Codes for CZCS

	CEOS file	CEOS record	CEOS mission	CEOS origin
QL Catalog information	40	10	22	50
QL Image record	40	20	22	50
LEAD Scene Header CZCS ESA	10	10	22	50
LEAD CRT Documentation CZCS	10	11	22	50
LEAD Image Location CZCS ESA	10	41	22	50
LEAD Orbit & Attitude CZCS	10	40	22	50
LEAD Radiometric Correction	10	60	22	50
LEAD Data Scale Histogram	10	61	22	50
IMOP LINN CZCS ESA	50	20	22	50
TRAI Trailer Record CZCS ESA	90	10	22	50

5.2 Record Fields Codes

These are the names used for the fields and group of fields in the CZCS LEVEL2 ESA format description.

REC_IDE_SEGM - Identifies the Record Identification Segment.

VOL_DOC_SEGM - Identifies the Volume Documentation Segment of the Volume Descriptor Record.

VOL_IDE_SEGM - Identifies the Volume Identification Segment of the Volume Descriptor Record.

FILE_IDE_SEGM - Identifies the File Identification Segment appearing in the File Pointer Record.

FDR_FIXED_SEGM - The File Descriptor Record Fixed Segment appear in each File Descriptor Record.

FDR_VARIA_SEGM - The same is for the File Descriptor Record Variable segment.

QL_IMA_PAR - Identifies the Quicklook Image Parameter segment of the Quicklook File Descriptor Record.

QL_REC_PAR - Identifies the Quicklook Record Parameter Segment of the Quicklook File Descriptor Record.

QL_IMA_DESC - Identifies the Quicklook Image Description Segment of the Quicklook File Descriptor Record.

QL_IMA_PXL_DESC- Identifies the Quicklook Image Pixel Description Segment of the Quicklook File Descriptor Record.

CAT_INFO_SEGM - Identifies the Catalogue Information Segment of the Catalogue Information Record.

SCE_PAR - Identifies the Scene Parameters Segment in the Scene Header Record

MIS_PAR - Identifies the Mission Parameters Segment in the Scene Header Record.

SEN_PAR - Identifies the Sensor Parameters Segment in the Scene Header Record.

FRAME_PAR - Identifies the Frame Parameters Segment in the Scene Header Record.

PRO_PAR - Identifies the Processing Parameters Segment in the Scene Header Record.

CRT_DOC_SEGM - Identifies the CRT Documentation Segment in the CRT Documentation Record.

ILT_TYPA_SEGM - Identifies the ILT TYPE A data Segment of the CRTT Documentation Record.

EPHE_DAT_SEGM - Identifies the Ephemeris Data Segment in the Orbit and Attitude Data Record.

ATTI_DAT_SEGM - Identifies the Attitude Data Segment in the Orbit and Attitude Data Record.

W/L/C DISC_PAR - Identifies the Water/Land/Cloud Discrimination Parameters Segment in the

Radiometric Correction Parameter Record.

RAD_CAL_PAR - Identifies the Radiometric Calibration Parameters Segment in the Radiometric Correction Parameter Record.

PRE_CAL_PAR - Identifies the Prelaunch Calibration Parameters Segment in the Radiometric Correction Parameter Record.

ADJ_PAR - Identifies the Adjust Parameters Segment in the Radiometric Correction Parameter Record.

SEN_DEC_PAR - Identifies the Sensitivity Decay Parameters Segment in the Radiometric Correction Parameter Record.

ATM_COR_PAR - Identifies the Atmospheric Correction Parameters Segment in the Radiometric Correction Parameter Record.

COM_PAR - Identifies the Common Parameters Segment in the Radiometric Correction Parameter Record.

RAY_COR_PAR - Identifies the Rayleigh Correction Parameters Segment in the Radiometric Correction Parameter Record.

AER_COR_PAR - Identifies the Aerosol Correction Parameters Segment in the Radiometric Correction Parameter Record.

WAT_DESC_PAR - Identifies the Case 1 and Case 2 Water Discrimination Parameters in the Radiometric Correction Parameter Record.

ITER_CALC_PAR - Identifies the Iteration Calculation Parameters Segment in the Radiometric Correction Parameter Record.

GEO_PROC_PAR - Identifies the Geophysical Processing Parameters Record in the Radiometric Correction Parameter Record.

DAT_SCA_SEGM - Identifies the Data Scale Segment in the Data Scale and Histogram Record.

HIST_DAT_SEGM - Identifies the Histogram Data Segment in the Data Scale and Histogram Record.

PIX_PAR - Identifies the Pixel Group Parameters Segment in the File Descriptor Record of the Imagery File.

IMA_PAR - Identifies the Image Parameters Segment in the File Descriptor Record of the Imagery File.

REC_PAR - The same for the Record Parameters Segments.

LOC_FIELDS - The Prefix/Suffix Locators Fields Segment appear in the File Descriptor Record of the Imagery File.

DATA_DESC - Identifies the Pixel Data Description Segment in the File Descriptor Record.

LINN_DESC - LINN Description appear in the File Descriptor Record of the Imagery File.

PRE_DATA - Identifies the Prefix Data Segment in the

IMAGERY_VOLUME
IMAGERY_FILE
IMAGE_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		Record Identification Segment	
1		1	4	B4	Record sequence number (2,...,971)	
2		5		B1	File Code (according to CEOS definition)	50
3		6		B1	Record Code (according to CEOS definition)	20
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Record length	25200
PRE_DATA	*	13	44		PREFIX DATA	
7		13	16	B4	Scan line in current logical volume = 1, ...,970	
8		17	20	B4	Channel number - n/a for LINN	
9	*	21	24		Grid contents Indicator of band 5 1 = present, 0 = absent	
9,1		21		B1	State Boundary Grid Indicator	0
9,2		22		B1	Coastline Grid Indicator	0
9,3		23		B1	Latitude/Longitude Grid Indicator	1
9,4		24		B1	Spare	
10	*	25	28		Pixel information contents indicator of band 5 1 = present, 0 = absent	
10,1		25		B1	Discrimination of Ch.4 saturation indicator	1
10,2		26		B1	Discrimination of water type 1/2 indicator	1
10,3		27		B1	Discrimination of algorithm 1/2 indicator	1
10,4		28		B1	Spare	
11	*	29	32	B4	Spare	
12		33	36	B4	Station Time (UT) at start of scanning volume in millisec. of day	
13		37	40	B4	Number of left fill pixels	0
14		41	44	B4	Number of right fill pixels	0
IMA_DATA	*	45	23660		IMAGE Data for CZCS Level 2 Bands 1-12 in LINN format	
15		45	2012	196881	CZCS Level 2 Band 1 data	
16		2013	3980	196881	CZCS Level 2 Band 2 data	
17		3981	5948	196881	CZCS Level 2 Band 3 data	
18		5949	7916	196881	CZCS Level 2 Band 4 data	
19		7917	9884	196881	CZCS Level 2 Band 5 data	
20		9885	11852	196881	CZCS Lebel 2 Band 6 data	
21		11853	13820	196881	CZCS Lebel 2 Band 7 data	
22		13821	15788	196881	CZCS Level 2 Band 8 data	
23		15789	17756	196881	CZCS Level 2 Band 9 data	
24		17757	19724	196881	CZCS Level 2 Band 10 data	
25		19725	21692	196881	CZCS Level 2 Band 11 data	
26		21693	23660	196881	CZCS Level 2 Band 12 data	
SUF_DATA		*23661	25200		SUFFIX DATA:	
27		*23661	23664		Scan line Quality Indicator	
27,1		23661		B1	Bit slip/Sync loss indicator (1/0 = YES/NO)	
27,2		23662		B1	Spare	
27,3		23663		B1	Spare	Blank

27,4	23664	B1	Spare	Blank
28	23665 23684	B20	Spare	
29	23685 23688	B4	Line length of one band (fixed suffix position: bytes 25-28)	1968
	*23699 23896		CZCS calibration data(raw) from the CRT	
30	23699 23720	1682	Voltage staircase counts of ch.1 from step 1 to step 16	
31	23721 23752	1682	Voltage staircase counts of ch.2	
32	23753 23784	1682	Voltage staircase counts of ch.3	
33	23785 23816	1682	Voltage staircase counts of ch.4	
34	23817 23848	1682	Voltage staircase counts of ch.5	
35	23849 23880	1682	Voltage staircase counts of ch.6	
36	23881 23882	B2	Ch.1 calibration lamp radiance count	
37	23883 23884	B2	Ch.2 calibration lamp radiance count	
38	23885 23886	B2	Ch.3 calibration lamp radiance count	
39	23887 23888	B2	Ch.4 calibration lamp radiance count	
40	23889 23890	B2	Ch.5 calibration lamp radiance count	
41	23891 23892	B2	Ch.6 blackbody calibration count	
42	23893 23894	B2	Blackbody temperature count	
43	*23895 23900		Location, angles, pressure and ozone contents Indicator for current line: 1/0 - data present/absent respectively	
43,1	23895	B1	Earth location indicator	1
43,2	23896	B1	Sun angles indicator	1
43,3	23897	B1	Satellite angle indicator	1
43,4	23898	B1	Rayleigh atmospheric thickness indicator	
43,5	23899	B1	Ozone concentration thickness indicator	
43,6	23900	B1	Spare	Blank
44	*23901 24362		Location Data for 77 CZCS anchor points in 1/10000 degrees	
	23901 23903	B3	Latitude anchor point 1	
	23904 23906	B3	Longitude anchor point 1	
			 2-76	
	24357 24359	B3	Latitude anchor point 77	
	24360 24362	B3	Longitude anchor point 77	
45	*24363 24506		Sun Angles for 77 CZCS anchor points in 1/100 degree:	
	24363 24364	B2	Zenith anchor point 1	
			 2-76	
	24515 24516	B2	Zenith anchor point 77	
46	*24517 24824		Satellite Angles for 77 CZCS anchor points in 1/100 degree:	
	24517 24518	B2	Zenith anchor point 1	
	24519 24520	B2	Sun satellite Azimuth anchor point 1	
			 2-76	
	24821 24822	B2	Zenith anchor point 77	
	24823 24824	B2	Sun satellite Azimuth anchor point 77	
47	24825 24978	77B2	Rayleigh atmosphere thickness	
48	24979 25132	77B2	Ozone concentration thickness	
49	25133 25200		Spare	Blanks

67-31	853	856	I4	Number of left fill bits within pixel	$$$0
67-32	857	860	I4	Number of right fill bits within pixel	$$$0
67-33	861	868	I8	Maximum data range of pixel values	$$$$$255
67-34	869	876	A8	Left fill pixel bit data description	$$$$$$$$
67-35	877	884	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 8	
67-36	885	888	I4	Number of left fill bits within pixel	$$$0
67-37	889	892	I4	Number of right fill bits within pixel	$$$0
67-38	893	900	I8	Maximum data range of pixel values	$$$$$255
67-39	901	908	A8	Left fill pixel bit data description	$$$$$$$$
67-40	909	916	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 9	
67-41	917	920	I4	Number of left fill bits within pixel	$$$0
67-42	921	924	I4	Number of right fill bits within pixel	$$$0
67-43	925	932	I8	Maximum data range of pixel values	$$$$$255
67-44	933	940	A8	Left fill pixel bit data description	$$$$$$$$
67-45	941	948	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 10	
67-46	949	952	I4	Number of left fill bits within pixel	$$$0
67-47	953	956	I4	Number of right fill bits within pixel	$$$0
67-48	957	964	I8	Maximum data range of pixel values	$$$$$255
67-49	965	972	A8	Left fill pixel bit data description:	$$$$$$$$
67-50	973	980	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 11	
67-51	981	984	I4	Number of left fill bits within pixel	$$$0
67-52	985	988	I4	Number of right fill bits within pixel	$$$0
67-53	989	996	I8	Maximum data range of pixel values	$$$$$255
67-54	997	1004	A8	Left fill pixel bit data description	$$$$$$$$
67-55	1005	1012	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 12	
67-56	1013	1016	I4	Number of left fill bits within pixel	$$$0
67-57	1017	1020	I4	Number of right fill bits within pixel	$$$0
67-58	1021	1028	I8	Maximum data range of pixel values	$$$$$255
67-59	1029	1036	A8	Left fill pixel bit data description	$$$$$$$$
67-60	1037	1044	A8	Right fill pixel bit data description	$$$$$$$$
68	1045	25200		Blanks	Blanks

IMAGERY_VOLUME
TRAILER_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	90
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>, (Initially '$A', then '$B',etc.)	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$4
14		49	64	A16	File Name	NI7$CZCSTRAILINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	N
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	360		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of trailer records	$$$$$1
30		187	192	I6	Trailer record length	$$$360

31		193	216	A24	Reserved (blanks)	Blanks
LOC_FIELDS	*	217	264		LOCATORS FIELDS	

Locator field structure is as follows:

```
!!!!!!          Byte  1- 6: Record number containing that field
......!!!!!!    Byte  7-12: Byte position of the field within record
............!!!  Byte 13-15: Length of field in bytes
..............!  Byte    16: Data type code of field
```

32		217	232	A16	Quality code summary map field locator	$$$$$2$$$$21$32N
33		233	264	A32	Blanks	Blanks
34		249	360		Blanks	Blanks

IMAGERY_VOLUME
IMAGERY_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	63
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	25200
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>,where XX='$A', etc.	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$3
14		49	64	A16	File Name	NI7$CZCSIMOPLINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	22680		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of image records(up to 970)	
30		187	192	I6	Image records length	$25200

31		193	216		Reserved (blanks)	Blanks
PIX_PAR	*	217	232		PIXEL GROUP PARAMETERS: - n/a for LINN -	
32		217	220	I4	Number of bits per pixel	$$$0
33		221	224	I4	Number of pixels per data group	$$$0
34		225	228	I4	Number of bytes per data group	$$$0
35		229	232	A4	Justification and order of pixels within data group	$$$$
IMA_PAR	*	233	272		IMAGE PARAMETERS	
36		233	236	I4	Number of bands of imagery in this file	$$12
37		237	244	I8	Number of lines per image (one band) in this file (up to $$$$$970)	
38		245	248	I4	Number of left border pixels	$$$0
39		249	256	I8	Number of image pixels per line	$$$$1968
40		257	260	I4	Number of right border pixels	$$$0
41		261	264	I4	Number of top border lines	$$$0
42		265	268	I4	Number of bottom border lines	$$$0
43		269	272	A4	Interleaving indicator	LI12
REC_PAR	*	273	296		RECORD PARAMETERS	
44		273	274	I2	Number of physical records per line	$1
45		275	276	I2	Number of physical records per multispectral line in this file	$1
46		277	280	I4	Number of bytes of prefix data per record	$$32
47		281	288	I8	Number of bytes of image data per record	$$$23616
48		289	292	I4	Number of bytes of suffix data per record	1540
49		293	296	I4	Prefix/suffix repeat flag	$$$$
PS_LOC_FIELDS	*	297	432		PREFIX/SUFFIX LOCATORS FIELDS	

The format for an 8 byte ASCII locator should be as follows :

Bytes 1-4 = start byte number of the field within prefix/suffix.

Bytes 5-6 = length in bytes of the field to be located.

Byte 7 = letter 'P' or 'S' indicating the location of field is prefix or suffix.

Byte 8 = type of data format

A = ASCII

B = Binary

N = Numeric ASCII

50		297	304	A8	Scan line number locator	$$$1$4PB
51		305	312	A8	Blanks	Blanks
52		313	320	A8	Time of scan line locator	$$21$4PB
53		321	328	A8	Left-fill count locator	$$25$4PB
54		329	336	A8	Right-fill count locator	$$29$4PB
55		337	340	A8	Blanks	Blanks
56		341	368	A8	Blanks	Blanks
57		369	376	A8	Scan line quality code locator	$$$1$4SB
58		377	384	A8	Calibration information locator	$$2999SB
59		385	432		Blanks	Blanks
DATA_DESC	*	433	464		PIXEL DATA DESCRIPTION: - n/a for LINN -	
60		433	436	I4	Number of left fill bits within pixel	$$$0

61		437	440	I4	Number of right fill bits within pixel	$$$0
62		441	448	I8	Maximum available data range of pixel (from zero)	$$$$$$$0
63		449	456	A8	Left fill pixel bits data description	$$$$$$$$
64		457	464	A8	Right fill pixel bits data description	$$$$$$$$
LINN_DESC	*	465	1044		LINN Description:	
65		465	468	I4	Number of bands per line for LINN interleaving	$$12
					LINN Pixel Group data Band 1:	
66-1		469	472	I4	Number of bits per pixel	$$$8
66-2		473	476	I4	Number of pixel per data group	$$$1
66-3		477	480	I4	Number of bytes per data group	$$$1
66-4		481	484	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 2:	
66-5		485	488	I4	Number of bits per pixel	$$$8
66-6		489	492	I4	Number of pixel per data group	$$$1
66-7		493	496	I4	Number of bytes per data group	$$$1
66-8		497	500	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 3:	
66-9		501	504	I4	Number of bits per pixel	$$$8
66-10		505	508	I4	Number of pixel per data group	$$$1
66-11		509	512	I4	Number of bytes per data group	$$$1
66-12		513	516	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 4:	
66-13		517	520	I4	Number of bits per pixel	$$$8
66-14		521	524	I4	Number of pixel per data group	$$$1
66-15		525	528	I4	Number of bytes per data group	$$$1
66-16		529	532	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 5:	
66-17		533	536	I4	Number of bits per pixel	$$$8
66-18		537	540	I4	Number of pixel per data group	$$$1
66-19		541	544	I4	Number of bytes per data group	$$$1
66-20		545	548	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 6:	
66-21		549	552	I4	Number of bits per pixel	$$$8
66-22		553	556	I4	Number of pixel per data group	$$$1
66-23		557	560	I4	Number of bytes per data group	$$$1
66-24		561	564	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 7:	
66-25		565	568	I4	Number of bits per pixel	$$$8
66-26		569	572	I4	Number of pixel per data group	$$$1
66-27		573	576	I4	Number of bytes per data group	$$$1
66-28		577	580	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 8:	
66-29		581	584	I4	Number of bits per pixel	$$$8
66-30		585	588	I4	Number of pixel per data group	$$$1
66-31		589	592	I4	Number of bytes per data group	$$$1
66-32		593	596	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 9:	
66-33		597	600	I4	Number of bits per pixel	$$$8
66-34		601	604	I4	Number of pixel per data group	$$$1

66-35	605	608	I4	Number of bytes per data group	$$$1
66-36	609	612	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 10:	
66-37	613	616	I4	Number of bits per pixel	$$$8
66-38	617	620	I4	Number of pixel per data group	$$$1
66-39	621	624	I4	Number of bytes per data group	$$$1
66-40	625	628	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 11:	
66-41	629	632	I4	Number of bits per pixel	$$$8
66-42	633	636	I4	Number of pixel per data group	$$$1
66-43	637	640	I4	Number of bytes per data group	$$$1
66-44	641	644	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 12:	
66-45	645	648	I4	Number of bits per pixel	$$$8
66-46	649	652	I4	Number of pixel per data group	$$$1
66-47	653	656	I4	Number of bytes per data group	$$$1
66-48	657	660	A4	Justification and order of pixels within data	RJLR
				LINN Pixel data description Band 1	
67-1	661	664	I4	Number of left fill bits within pixel	$$$0
67-2	665	668	I4	Number of right fill bits within pixel	$$$0
67-3	669	676	I8	Maximum data range of pixel values	$255
67-4	677	684	A8	Left fill pixel bit data description	$$$$$$$$
67-5	685	692	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 2	
67-6	693	696	I4	Number of left fill bits within pixel	$$$0
67-7	697	700	I4	Number of right fill bits within pixel	$$$0
67-8	701	708	I8	Maximum data range of pixel values	$$$$$255
67-9	709	716	A8	Left fill pixel bit data description	$$$$$$$$
67-10	717	724	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 3	
67-11	725	728	I4	Number of left fill bits within pixel	$$$0
67-12	729	732	I4	Number of right fill bits within pixel	$$$0
67-13	733	740	I8	Maximum data range of pixel values	$$$$$255
67-14	741	748	A8	Left fill pixel bit data description	$$$$$$$$
67-15	749	756	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 4	
67-16	757	760	I4	Number of left fill bits within pixel	$$$0
67-17	761	764	I4	Number of right fill bits within pixel	$$$0
67-18	765	772	I8	Maximum data range of pixel values	$$$$$255
67-19	773	780	A8	Left fill pixel bit data description	$$$$$$$$
67-20	781	788	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 5	
67-21	789	792	I4	Number of left fill bits within pixel	$$$0
67-22	793	796	I4	Number of right fill bits within pixel	$$$0
67-23	797	804	I8	Maximum data range of pixel values	$$$$$255
67-24	805	812	A8	Left fill pixel bit data description:	$$$$$$$$
67-25	813	820	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 6	
67-26	821	824	I4	Number of left fill bits within pixel	$$$0
67-27	825	828	I4	Number of right fill bits within pixel	$$$0
67-28	829	836	I8	Maximum data range of pixel values	$255
67-29	837	844	A8	Left fill pixel bit data description	$$$$$$$$
67-30	845	852	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 7	

CZCS LEVEL 2 PRODUCT

CCT FORMAT SPECIFICATION

REV. 1-1

Jan 10, 1992

DOCUMENT HISTORY:

DATE	VERSION	REVISED PAGE
August 6, 1990	Rev 0	First Draft. Pressure record is not defined
October 4,1990	Rev 0-1	Revised based on the discussion with JRC P.4,9,10,13,28,29,30,31,32,33,34,35,36, 37,38,39,41,47
October 23,1990	Rev 0-2	Addition of the Quicklook File,etc. P.1,3-1,4,5,6,7,7-1,7-2,7-3,7-4,7-5, 8,9,12,13,28,29,30,31,32,40,48,49
Nov.27, 1990	Rev 0-3	Correction of the errors P.10,11,12,29,30,31,32,33,34,35,36,37, 38,39,41,49
Dec.7, 1990	Rev 0-4	Rivision of the ozone and pressure record,etc.
Feb.22,1991	Rev 0-5	Revised based on JRC/ESA IF meeting
May.02,1991	Rev 0-6	Revised specifications by JRC suppression of pages 43, 44
.....		
Jan.10,1992	Rev 1-1	Definitive document revised by ESA & JRC accordingly to the software delivery "CZCS Level 2 processing & archiving"

1. Overview of the Standard Family Format

The CZCS Level-2 digital products are recorded on Computer Compatible Tapes (CCTs) in a format that is conformed to the Standard Family Format (SFF) conventions. This format has been recommended by the Landsat Technical Working Group (LTWG) and the Committee on Earth Observation Systems (CEOS). The SFF allows to read the same software data on CCTs that have been generated by different stations.

Conventionally, the individual tape is referred to as a physical volume. The logical volume refers to data files logically grouped on the tape. The SFF allows that more than one logical volume (a volume set) be stored on the same physical volume. One logical volume can also be split between different physical volumes.

The Standard Family of CCT Formats uses the "superstructure concept" in which data are organized at four distinct levels: volume, file, record, and data field. Data products are organized into two main logical volumes: Imagery and Supplemental Volumes. The Imagery Volume contains the imagery data itself and related image-synchronized information, with data only related to the scene. The Supplemental Volume is generally defined to contain station-related processing data such as annotation, ephemeris and attitude data. The Null Volume ends a logical volume.

Typical logical volume consists of the following files(Fig.1):
- a volume directory file which contains the logical and physical structure of the tape (the number of all files on the CCT: the position and content of these files; the number of records and maximum record length within each files);
- the data file(S) : the imagery files are preceded by a quicklook file & leader file and followed by a trailer file (the quicklook file contains quicklook image and catalogue information; the leader file contains scene introductory information; the trailer file contains quality flags as determined during the scene processing);
- a null volume directory file which indicates the end of the logical volume of a volume set (a collection of logical volumes; when the logical volume spans over more than one physical volume, the volume directory file for that logical volume is repeated at the start of the new tape.

The superstructure records consist of:
- a volume descriptor record which contains the information that applies to the logical volume as a whole such as information on the data source, physical volume identification, logical volume identification within the tape or tape set and specifies the number of file pointer records (hence the number of data files) and text records;
- a file pointer record for each of the files to supply the number and name of the associated data files, the maximum record length and the type and format of the data;
- text record(s) corresponding to the "comment statements" of a

computer programme to provide information in human readable form. ESA/EPO uses the text record to specify the product type and processing performed, the location, data and time of product creation, the specific scene identification and the physical tape identification. It is therefore used to confirm that the correct tape is being processed.

Each data file starts with a file descriptor record which explains the number of data in the file and contains location of significant data field: the "fixed" data segment specifies the file number, name and format and the "variable"segment the location of important data partitions in the file.

All records start with the record introductory information stored in binary(total of 12 bytes) which consists of:
- record sequence number (4 bytes)
- record type (4 bytes)
- record length (4 bytes)

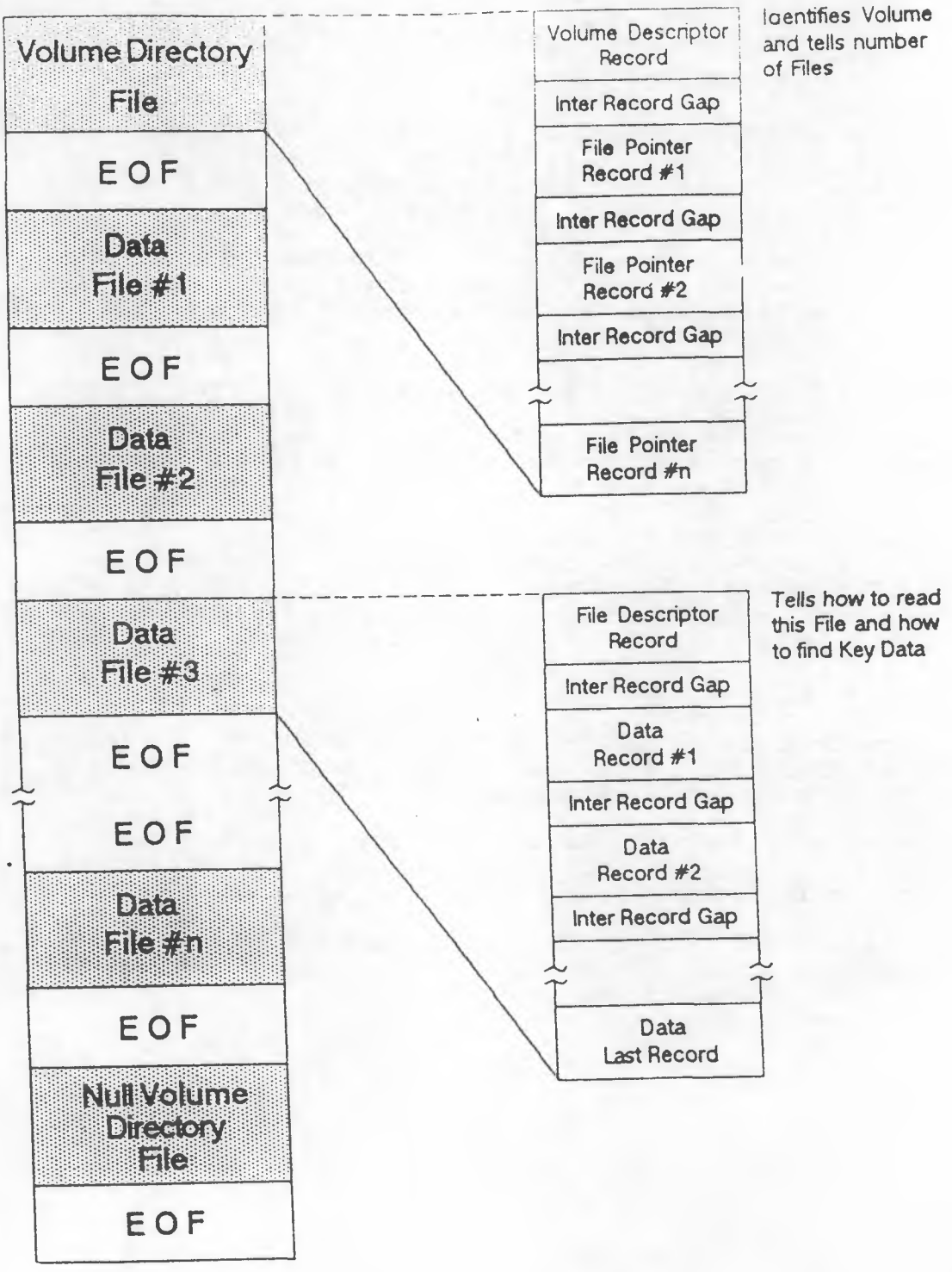


Figure 1: The Standard CCT Format – Overview

2 Overview of the CZCS Level-2 CCT format

The information contained in the ESA/EPO CZCS Level-2 CCT products is organized in one Imagery logical volume. The data organization within each logical volume is summarized below and in figure 2 and 3.

The Volume directory file has 6 records, namely the Volume descriptor and four file pointers (for the Quicklook, the Leader, the Image, and the Trailer files), plus a Text record. Each record is 360 bytes long.

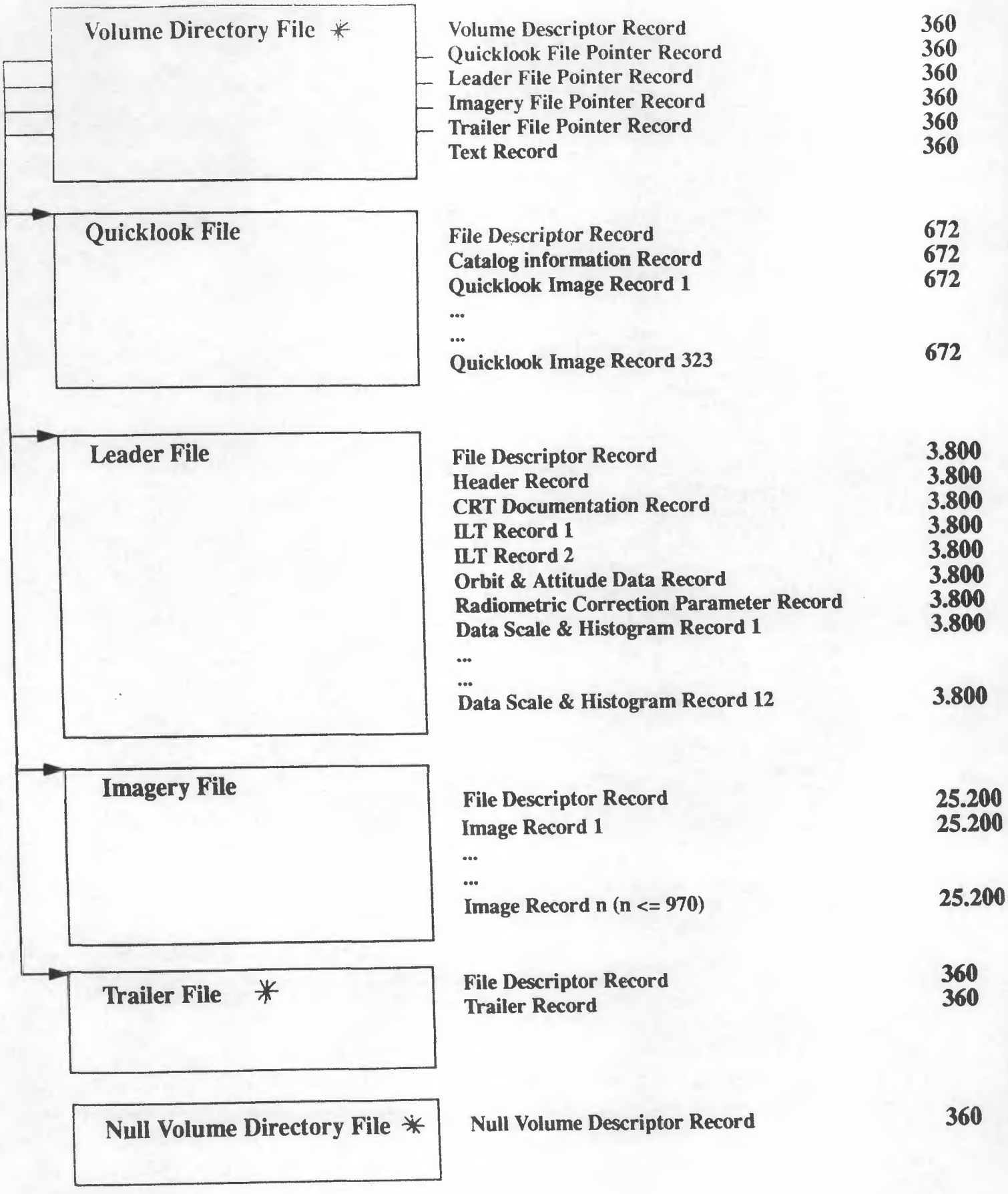
The imagery data file is preceded by a Quicklook file & a Leader file and followed by a Trailer file. The Quicklook file contains up to 325 records. A file descriptor record, a catalogue information record and up to 323 quicklook image records. Each record is 672 bytes long.

The leader file has 21 fixed records, namely the file descriptor, the scene header and 19 ancillary records. The ancillary records are CRT documentation record, 2 ILT records, orbit & attitude data record, radiometric correction parameter record, and 12 data scale & histogram records. Each record is 3800 bytes long.

The image file contains up to 971 records: a file descriptor record and up to 970 image records of 25200 bytes each. The imagery data are organized in Line INterleaved by N-bands (LINN); in this organization the data for one scan line in the 12 bands are grouped in one physical record.

The trailer file contains some quality flags as determined during the scene processing. The file contains 2 records of 360 bytes each: the file descriptor and the trailer record.

The image data for CZCS Level-2 products are calibrated, atmospheric effect corrected, and converted to the geophysical parameters. Geometric parameters are contained, but no geometric correction is applied.



* Not present in "tar" Format

3. Logical volume content description

3.1 Volume Directory File

3.1.1 Volume Descriptor Record

The volume descriptor record contains:
- the software release number
- the tape identification
- the logical volume identification
- the logical volume generating country
- the logical volume generating agency
- the logical volume generating facility
- the number of the logical volume
- the number of file pointer records
- the total number of records in the file

3.1.2 File Pointer Records

Each pointer record provides information about its referenced or associated file:
- class: Quicklook, Leader, Imagery, or Trailer
- class code: QUIC, LEAD, IMOP, or TRAI
- data type: MIXED BINARY AND ASCII or BINARY ONLY
- data type code: MBAA (mixed binary and ASCII) or BINO (binary only)
- number of records
- record length in bytes
- record length type: always FIXED LENGTH
- record length type code: always FIXD (fixed length)

3.1.3 Text Record

The text record is the last record in the volume directory file. It contains:
- the product identification
- the tape identification with the tape creation time.
- the scene identification with the time of acquisition at the scene center.

3.2 Quicklook File

3.2.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of record present in the quicklook file. The variable segment also contains quicklook look image parameter, record parameter, image description and image pixel data description.

3.2.2 Catalogue Information Record

This record contains all the information which will be recorded in the Catalogue system.

3.2.3 Quicklook Image Record

This record contains 1 line quicklook image (= 656 pixels)
The quicklook image recorded in L-2 product is the same as that of L-1 product.

3.3 Leader File

3.3.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of records present in the leader file:
- scene header record (1)
- ancillary records (always 19 fixed records)

There are no annotation records.
The locator fields supply the location and format of 8 important data fields within the leader file. Standard codes used for the locators are explained in the logical volume content description.

3.3.2 Scene Header Record

This record provides information about scene, mission, sensor, frame and processing parameters.
The scene parameters include:
- product identification ; this parameter represents the data correction status, such as calibrated or not, geophysically processed or not, location information contained or not.
- input scene identification ; this parameter represents the time (GMT) of the acquisition of the first scan line.
- location of scene center in latitude and longitude and in line and pixel in the line.
- time at the scene center (central scan line) expressed in year/ month/day/hour/minute/second/millisecond

The mission parameters contain fixed information about the mission plus a flag for ascending/descending path, and the time of ascending/descending node.

The sensor parameters contain the upper and lower limits expressed in nanometers, of the wavelengths sensed by the instrument. Gain value and tilt angle actually used for the processing of this scene are also contained.

The frame parameters contain the number of scene pixels per line and the number of scene lines.

The processing parameters indicate that CZCS Level-2 products are radiometrically calibrated, converted to geophysical parameters, but not geometrically corrected.

3.3.3 CRT Documentation Record

The content of this record is extracted from the Level-1 CRT documentation record put at the end of the CRTdata File. ILT(Image Location Tape) data are not contained.

3.3.4 ILT Record

There are 2 ILT records. The first one is extracted from the Level-1 CRT documentatior record put at the top of the CRTdata File, while the second one is extracted from the Level-1 CRT documentation record put at the end of the CRTdata File.

3.3.5 Orbit & Attitude Data Record

This record provides ephemeris and attitude data during the observation period. Ephemeris data are state vector, greenwich hour angle from aries, sub satellite latitude/longitude, and altitude. Ephemeris data are given every one minute, and the maximum number of the ephemeris data set contained in this record is 3. Attitude data are given every 4 seconds, and the maximum number of the attitude data set is 31.

3.3.6 Radiometric Correction Parameter Record

This record provides the information about the radiometric correction parameters used for processing this scene.

Water/land/cloud discrimination parameters contain the threshold values to discriminate water/land/cloud pixels.

Radiometric calibration parameters contain the prelaunch calibration parameter values and the coefficients to correct the sensitivity decay of CZCS.

Atmospheric correction parameters consist of the common parameters, rayleigh correction parameters, aerosol correction parameters, case 1/case 2 water discrimination parameters and iteration calculation parameters.

Common parameters contain solar parameter values, atmospheric parameter values and water parameter values which are used for the whole Level-2 processing.

Rayleigh correction parameters contain the information of the rayleigh scattering correction method (algorithm).

Aerosol correction parameters contain the information about the equations and the coefficients values used for correction of the mie scattering effect caused by the aerosol particles.

Case 1/case 2 water discrimination parameters contain the coefficients values of the polynomial equations used for discrimination.

Iteration calculation parameters contain information about iteration calculation for correction of the aerosol particle effect. initial values, conversion criteria values and iteration limit numbers are contained.

Geophysical processing parameters contain the information about the equations and the coefficients values used for calculation of the pigment concentration, both for case 1 and case 2 water case.

3.3.7 Data Scale & Histogram Record

There are 12 data scale & histogram records for 12 bands of Level-2 image data. This record provides data scale parameters which are necessary to convert the binary values of the image to the geophysical values. Some statistical information and the histogram values of the image are also contained.

3.4 Imagery File

3.4.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of record present in the imagery file.

The 8-byte data locators indicate the location and format of 6 important data fields within the imagery file. The seventh byte specifies, for each locator, if the information is stored in the prefix (P) or the suffix (S) parts of the image record.

The variable segment also describes the LINN format for "pixel group data" (one pixel) in each band: 8 bit-pixels with a right-justified format.

3.4.2 Image Record

This record is composed of three parts:
- prefix data
- image data
- suffix data

Most of the prefix and suffix data are located by the file descriptor record variable segment for the imagery file. Prefix data give the current scan line and the acquisition station time. Calibration and location information for 77 anchor points is provided in the suffix.

3.5 Trailer File

3.5.1 File Descriptor Record

One trailer file is associated with each imagery file. The file descriptor record is composed of a fixed segment which contains standard information and a variable segment the number and length of each type of records present in the leader file. The quality indicator is constructed in the same way as in the leader file.

3.5.2 Trailer Record

This record contains quality information associated with the image, such as the number of sync losses, parity errors, and bit slip occurrences.

3.6 Null Volume Directory File

This volume contains only the volume descriptor record. The structure is the same as the volume descriptor record of the imagery volume.

4. Format description

4.1 Introduction

This chapter describes in details the records within each file of the logical volume. The order of the description follows the order in which the file appears on the tape. Each record is represented as a table consisting of seven columns:

col 1 - name of the field or of the field-group (defined in Annex 2)
col 2 - field-group indicator: 'blank' if single field
'*' if field-group
col 3 - starting byte of the field (or field-group)
col 4 - last byte of the field (or field-group)
col 5 - format in which the data of this field is written (described below)
col 6 - definition and explanation of the content of the field (or field-group)
col 7 - actual content of the field if it is a constant for an ESA/EPO product.

The format described in column 5 is standard Fortran. The main formats used in this product are:

xBn = x times data written in binary form on n bytes (unformatted);
xIn = x times data written as integer values formatted on n digits (e.g., 123 written as 1I4 is: " 123");
xFn.m = x times data written as real numbers on a total of n digits including dot and sign, with m digits for the decimal part (e.g., 123.456 written as 1F10.4 is: +123.4560");
xAn = x strings of n ASCII characters.

4.2 Record table

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
VOLUME_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
VOL_DOC_SEGM	*	17	44		Volume Documentation Segment	
9		17	28	A12	Superstructure control document number	CCB-CCT-0002
10		29	30	A2	Superstructure control document revision number	$F
11		31	32	A2	Superstructure record format revision letter <XX> (initially '$A',then '$B',etc...)	$A
12		33	44	A12	Software release number:NICZ-002-XXX initially XXX = 001,then 002,etc.	
VOL_IDE_SEGM	*	45	172		Volume Identification Segment	
13	**	45	60	A16	Physical Volume identification: <MNNS$YYDDDHHMM$$> M - Mission (=B for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of tape creation DDD- Day of tape creation HH - Hour of tape creation MM - Minute of tape creation	
14		61	76	A16	Logical Volume ID : <MNNS$YYDDDHHMM00>	
15		77	92	A16	Volume Set ID	NIMBUS7CZCS$L2
16		93	94	I2	Number of Physical Volumes in the Set	$1
17		95	96	I2	Physical Volume Number, Start of Logical Volume	$1
18		97	98	I2	Physical Volume Number, End of Logical Volume	$1
19		99	100	I2	Physical Volume sequence number (i.e. of current tape)	$1
20		101	104	I4	First Referenced File Number in this Physical Volume	$$$1
21		105	108	I4	Logical Volume Number within Volume Set	$$$1
22		109	112	I4	Logical Volume Number within Physical Volume	$$$1
23		113	120	A8	Logical Volume Creation Date <YYYYMMDD>	
24		121	128	A8	Logical Volume Creation Time <HHMMSSXX>	
25		129	140	A12	Logical Volume Generating Country	
26		141	148	A8	Logical Volume Generating Agency	
27		149	160	A12	Logical Volume Generating Facility	
28		161	164	I4	Number of Pointer Records in Volume Directory	$$$4
29		165	168	I4	Number of Records in Volume Directory	$$$6
30		169	172	I4	Number of Logical Volumes on this Physical Volume	$$$1

31	173	260	A88	Volume Descriptor Spare Segment	Blanks
32	261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
QUICKLOOK_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$1
10		21	36	A16	Referenced File Name	NI7$CZCS$Q/LLINN
11		37	64	A28	Referenced File Class	QUICKLOOK$FILE
12		65	68	A4	Referenced File Class Code	QUIC
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$325
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$$672
17		117	124	I8	Referenced File Maximum Record Length	$$$$$672
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
LEADER_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	3
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$2
10		21	36	A16	Referenced File Name	NI7$CZCSLEADLINN
11		37	64	A28	Referenced File Class	LEADER$FILE
12		65	68	A4	Referenced File Class Code	LEAD
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$$21
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$3800
17		117	124	I8	Referenced File Maximum Record Length	$$$$3800
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
IMAGERY_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1		B4	Record Sequence Number	4
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$3
10		21	36	A16	Referenced File Name	NI7$CZCSIMOPLINN
11		37	64	A28	Referenced File Class	IMAGERY$FILE
12		65	68	A4	Referenced File Class Code	IMOP
13		69	96	A28	Referenced File Data Type	BINARY$ONLY
14		97	100	A4	Referenced File Data Type Code	BINO
15		101	108	I8	Number of Records in Referenced File (up to $$$$$971)	
16		109	116	I8	Referenced File - Descriptor Record Length	$$$25200
17		117	124	I8	Referenced File Maximum Record Length	$$$25200
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
TRAILER_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	5
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$4
10		21	36	A16	Referenced File Name	NI7$CZCSTRAILINN
11		37	64	A28	Referenced File Class	TRAILER$FILE
12		65	68	A4	Referenced File Class Code	TRAI
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$$$2
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$$360
17		117	124	I8	Referenced File Maximum Record Length	$$$$$360
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
TEXT_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	6
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	63
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC flag for this record	A$
8		15	16	A2	Continuation flag. This field contains two blanks unless the information of this record is continued on a following record, in which case, the field is coded C$.	$$
9		17	66	A50	Product identification: PRODUCT:NIMBUSNNCZCS$LINN$GEOPHYSICAL$VALUE$$$<CrLf> (for Level 2) PRODUCT:NIMBUSNNCZCS$CRT$$$$$$$$$$$$$$$$$$$$$$$$<CrLf> (for Level 1)	
10		67	124	A58	Location, date and Time of product generation (ex.PROCESSED:$$ITALY$$$$$$$$ESA-EPOONYYYYMMDDATHHMMSS$$<CrLf>	
11		125	148	A24	Tape ID TAPEID:$MNNS$YYDDDHHMM<CrLf>, where M - Mission, e.g. B for NIMBUS NN - Mission number, e.g. 07 for NIMBUS-7 S - Sensor ID, e.g. C for CZCS YY - Year of creation DDD- Day of creation HH - Hour of creation MM - Minute of creation	
12		149	178	A30	Scene Identification SCENE$$:$MNNS$YYDDDHHMMSSmmm<CrLf>, where M - Mission, e.g. B for NIMBUS NN - Mission number,e.g. 07 for NIMBUS-7 S - Sensor ID, e.g. C for CZCS YY - Year of scene acquisition DDD - Day of scene acquisition(001,...,366) HH - Hour of scene acquisition (00,...,23) MM - Minute of scene acquisition(00,...,59) SS - Second of scene acquisition(00,...,59) mmm - Milliseconds of scene acquisition (000,...,999)	
13		179	360	A182	Blanks	

IMAGERY_VOLUME
QUICKLOOK_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	63
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>,where XX='$A', etc.	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number NICZ-002-XXX, initially XXX=001,then 02,etc.	NICZ-002-001
13		45	48	I4	File Number	$$$1
14		49	64	A16	File Name	NI7$CZCSQ/L$LINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	668		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of Catalog Information Records	$$$$$1

30		187	192	I6	Number of Q/L Image Records	$$$323
31		193	198	I6	Catalog Information Record Length	$$$672
32		199	204	I6	Q/L Image Record Length	$$$672
33		205	232		Blanls	Blanks
QL_IMA_PAR	*	233	272		Q/L IMAGE PARAMETER	
34		233	236	I4	Number of bands of imagery in the Q/L image	$$$1
35		237	244	I8	Number of lines per Q/L image (one Q/L image record contains one line of Q/L image)	$$$323
36		245	248	I4	Number of left border pixels	$$$0
37		249	256	I8	Number of Q/L image pixels per line	$$$$$656
38		257	260	I4	Number of right border pixels	$$$0
39		261	264	I4	Number of top border lines	$$$0
40		265	268	I4	Number of bottom border lines	$$$0
41		269	272	A4	Interleaving indicator -n/a	
QL_REC_PAR	*	273	296		Q/L RECORD PARAMETER	
42		273	274	I2	Number of physical records per line	$1
43		275	276	I2	Number of physical records per multispectral line in the Q/L image records -n/a	$1
44		277	280	I4	Number of bytes of prefix data per record -n/a	
45		281	288	I8	Number of bytes of image data per Q/L image record	$$$$$656
46		289	292	I4	Number of bytes of suffix data per record -n/a	
47		293	296	I4	Prefix/suffix repeat flag -n/a	
48		297	464		Blanks	Blanks
QL_IMA_DESC	*	465	484		Q/L IMAGE DESCRIPTION	
49		465	468	I4	Number of bands per line	$$$1
					Q/L Image Pixel Group Data	
50		469	472	I4	Number of bits per pixel	$$$8
51		473	476	I4	Number of pixel per data group	$$$1
52		477	480	I4	Number of bytes per data group	$$$1
53		481	484	A4	Justification and order of pixels within data group	RJLR
QL_IMA_PXL_DESC	*	485	516		Q/L Image Pixel Data Description	
54		485	488	I4	Number of left fill bits within pixel	$$$0
55		489	492	I4	Number of right fill bits within pixel	$$$0
56		493	500	I8	Maximum data range of pixel values	$$$$$$64
57		501	508	A8	Left fill pixel bit data description -n/a	$$$$$$$$
58		509	516	A8	Right fill pixel bit data description -n/a	$$$$$$$$
59		517	672		Blanks	Blanks

IMAGERY_VOLUME
QUICKLOOK_FILE
CATALOG_INFORMATION_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	40
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
CAT_INFO_SEGM	*	17			Catalog Information Segment	
9		17	32	F16.8	Equator Crossing Longitude (degree ; 0 to 360 eastward)	
10		33	40	I8	Orbit Number	
11		41	46	A6	Aquisition Date (YYMMDD)	
12		47	52	A6	Equator Crossing Time (HHMMSS)	
13		53	58	A6	Image Start Time (HHMMSS)	
14		59	64	A6	Image Stop Time (HHMMSS)	
15		65	68	A4	Quicklook OK status Y$$$ = yes, N$$$ = no	
16		69	72	I4	Product Level ($$$2 = Level 2 product)	
17		73	88	A16	Station Code A2 & Scene name A14	
18		89	104	A16	Archived Optical Disk ID for this L-2 data	
19		105	120	A16	Archived Optical Disc ID for original L-1 data	
20		121	136	F16.8	NW Corner Latitude of Q/L Image (degree)	
21		137	152	F16.8	NW Corner Longitude of Q/L Image (degree ; 0 to 360 eastward)	
22		153	168	F16.8	SW Corner Latitude of Q/L Image (degree)	
23		169	184	F16.8	SW Corner Longitude of Q/L Image	
24		185	200	F16.8	SE Corner Latitude of Q/L Image (degree)	
25		201	216	F16.8	SE Corner Longitude of Q/L Image	
26		217	232	F16.8	NE Corner Latitude of Q/L Image (degree)	
27		233	248	F16.8	NE Corner Longitude of Q/L Image (degree ; 0 to 360 eastward)	
28		249	264	F16.8	Latitude of Q/L Image Center (degree)	
29		265	280	F16.8	Longitude of Q/L Image Center (degree ; 0 to 360 eastward)	
30		281	284	I4	Data Quality Flag (*)	
31		285	288	I4	Number of Bad or Missing Lines	
32		289	304	F16.8	Percentage of Water Pixels	
33		305	320	F16.8	Percentage of satured Water Pixels	
34		321	336	F16.8	Percentage of Case I Water Pixels	
35		337	352	F16.8	Percentage of Case II Water Pixels	
36		353	368	F16.8	Percentage of Water Pixels in NW Quadrant	
37		369	384	F16.8	Percentage of Water Pixels in SW Quadrant	

38	385	400	F16.8	Percentage of Water Pixels in SE Quadrant
39	401	416	F16.8	Percentage of Water Pixels in NE Quadrant
	417	432	F16.8	Percentage of Unprocessed Water Pixels
	433	448	F16.8	Angstrom exponent
	449	464	F16.8	Percentage of Unprocessed Water Pixels
42				in SE Quadrant (filled with 0.00000000)
	465	480	F16.8	Percentage of Unprocessed Water Pixels
43				in NE Quadrant (filled with 0.00000000)
44	481	496	F16.8	Tilt Angle of the CRT(degree)
45	497	500	I4	Gain value of the CRT($$$1,$$$2,$$$3 or $$$4)
46	501	516	F16.8	Sun Azimuth of Frame Center (degree)
47	517	532	F16.8	Sun Zenith of Frame Center (degree)
48	533	536	I4	Version number of the Level-2 processing
49	537	552	A16	Rayleigh Scattering Calculation Algorithm ID
50	553	568	A16	Sensitivity Loss Correction Algorithm ID
51	569	584	A16	Reflectance Model ID for Case I Water
52	585	600	A16	Reflectance Model ID for Case II Water
53	601	616	A16	Pigment Concentration Calculation Algorithm ID
				for Case I Water
54	617	632	A16	Pigment Concentration Calculation Algorithm ID
				for Case II Water
55	633	634	A2	TOMS ozone data used/not used flag
				Y$ = yes, N$ = no
56	635	636	A2	ECMWF preassure level data used/not used flag
				Y$ = yes, N$ = no
57	637	652	F16.8	Tilt Angle used for L-2 processing(degree)
58	653	656	I4	Gain value used for L-2 processing
				($$$1,$$$2,$$$3 or $$$4)
	657	660	I4	Water discrimination threshold (0 to 255)
	661	672	A12	To be used

IMAGERY_VOLUME
QUICKLOOK_FILE
QUICKLOOK_IMAGE_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	
2		5		B1	File Code (according to CEOS definition)	40
3		6		B1	Record Code (according to CEOS definition)	20
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
9		17	672	656B1	Quicklook Image Data of 1 line (= 656 pixels)	

IMAGERY_VOLUME
LEADER_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>, (Initially '$A',then '$B',etc.)	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$2
14		49	64	A16	File Name	NI7$CZCSLEADLINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	N
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks

FDR_VARIA_SEGM	*	181	1800		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of scene header records	$$$$$1
30		187	192	I6	Header record length	$$3800
31		193	198	I6	Number of ancillary records	$$$$19
					1 CRT documentation record	
					2 ILT records	
					1 orbit & attitude data record	
					1 ozone optical thickness record	
					1 molecular scattering optical thickness record	
					1 radiometric correction parameter record	
					12 data scale and histogram records	
32		199	204	I6	Ancillary record length	$$3800
33		205	210	I6	Number of annotation records	$$$$$0
34		211	216	I6	Annotation Record length	$$$$$0
LOC_FIELDS	*	217	376		LOCATOR FIELDS	
					The locator fields point to the position in	
					the file where various information can be found	
					coded in 16 bytes ASCII :	
					Bytes 1- 6 = record number containing that field	
					Bytes 7-12 = byte position of the field within	
					the record	
					Bytes 13-15 = length of field in bytes	
					Byte 16 = type of data code	
					A for alphanumeric;	
					B for binary;	
					N for numeric.	
35		217	232	A16	Scene identification field locator	$$$$$2$$$197$16A
36		233	248	A16	Blanks (not used)	Blanks
37		249	264	A16	Mission identification field locator	$$$$$2$$$309$16A
38		265	280	A16	Sensor identification field locator	$$$$$2$$$325$16A
39		281	296	A16	Scene center date-time field locator	$$$$$2$$$117$32A
40		297	312	A16	Geographic reference field locator	$$$$$2$$$213$32N
41		313	328	A16	Image processing performed field locator	$$$$$2$$1573$16A
42		329	344	A16	Image Format Indicator locator	$$$$$2$$1717$16A
43		345	360	A16	Band indicator locator	$$$$$2$$1653$64A
44		361	376	A16	Blanks	Blanks
45		377	3800	A3424	Blanks	Blanks

IMAGERY_VOLUME
LEADER_FILE
SCENE_HEADER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	Header record sequence number	$$$1
8		17	20	A4	Blanks	$$$$
SCE_PAR	*	21	308		SCENE PARAMETERS	
9		21	36	A16	Product identification Product identification defoned as: CALED = Calibrated GPHY = Geophysically processrd GEO = Location information contained	CZ$CALED$GPH$GEO
10		37	52	A16	Input scene identification <SYYMMDDHHMMSSmmm> where: S=Sensor ID, i.e. C for CZCS YY - Year (1,...,99) MM - Month (1,...,12) DD - Day of Month (1,...,31) HH - Hour (0,...,23) MM - Minute (0,...,59) SS - Second (0,...,59) mmm - Millisecond (000,...,999) GMT at which the first scan was imaged	
11		53	68	F16.8	Input scene (frame) centre latitude in degrees	
12		69	84	F16.8	Input scene (frame) centre longitude in degrees	
13		85	100	A16	Line number at input scene centre	
14		101	116	A16	Pixel number at input scene centre	$$$$$$$$$$$$$988
15		117	148	A32	Input scene centre time <YYYYMMDDHHMMSSmmm>, followed by 15 blanks, where YYYY=year MM=month DD=day HH=hours (00 to 23) MM=minutes (00 to 59) SS=seconds (00 to 59) mmm=milliseconds (000 to 999)	
16		149	164	I16	Spare	
17		165	180	A16	Spare	
18		181	196	I16	Spare	
19		197	212	A16	The processed scene identifier is the same as the input scene identifier - same as field 10	

20		213	228	F16.8	Same as field 11	
21		229	244	F16.8	Same as field 12	
22		245	260	F16.8	Same as field 13	
23		261	276	F16.8	Same as field 14	
24		277	292	I16	Blanks	
25		293	308	I16	Blanks	
MIS_PAR	*	309	404		MISSION PARAMETERS	
26		309	324	A16	Mission identification	NIMBUS-7$$$$$$$$
27		325	340	A16	Sensor identification	CZCS$$$$$$$$$$$$$
28		341	356	I16	Orbit number	
29		357	372	A16	Ascending/descending flag ASCENDING$$$YYYY where YYYY - year of node	
30		373	388	F16.8	Ascending/descending node in degrees	
31		389	404	A16	Time of ascending/descending node <MMDDHHMMSSmmm> followed by 3 blanks, where MM = month DD = day HH = hour (00 to 23) MM = minutes (00 to 59) SS = seconds (00 to 59) mmm = milliseconds (000 to 999)	
SEN_PAR	*	405	1428		SENSOR PARAMETERS	
32		405	500	1218	Upper and lower limits of wavelength range in nanometers B1 [433-453], B2 [510-530], B3 [540-560] B4 [660-680], B5 [700-800], B6 [1050-1250]	
33		501	516	I16	Number of active bands in the processed image. The total number of active bands is n. All subsequent reference to band number is by "logical band number" where each of the active bands, in ascending order, is assigned a logical band number in the range 1 to n(12).	
34		517	524	I8	CZCS gain value used for for processing this scene ($$$$$$$1,$$$$$$$2,$$$$$$$3 or $$$$$$$4)	
35		525	532	I8	The status of the CZCS threshold function for this scene ($$$$$$$1 = off, $$$$$$$2 = on)	
36		533	548	F16.8	The tilt angle used for processing this scene	
37		549	1428		Blanks	
FRAME_PAR	*	1429	1476		FRAME PARAMETERS	
38		1429	1444	I16	Number of scene pixels per line in the processed image	$$$$$$$$$$$$1968
39		1445	1460	I16	Number of scene lines in the processed image This is the actual number of scene lines in the imagery file following this Leader file.	
40		1461	1476	A16	Spare	
PRO_PAR	*	1477	2020		PROCESSING PARAMETERS	
41		1477	1488	A12	Calibration designator Calibration status is indicated by any combination of the following bytes codes NONE : none PI : raw data with pre-flight calibration data	PC$SC$$$$$$$

				information PC : calibrated by pre-flight data SC : calibrated by post-flight sensitivity decay data	
42		1489	1504	I16	Spare
43		1505	1520	A16	Geophysical processing designator Geophysical processing status is indicated by any combination of the following bytes codes NONE : none RC : Rayleigh scattering effect corrected AC : Aerosol scattering effect corrected PC : Pigment concentration calculated	RCACPC$$$$$$$$
44		1521	1536	A16	Geometric correction designator NONE - none System corrections will be indicated by any combination of the following byte codes, preceded by the characters SYSTEM: E - Earth rotation correction P - Panoramic distortion & earth curvature correction L - Line length correction	NONE$$$$$$$$$$$$
45		1537	1552	A16	Resampling algorithm designator NONE - None NN - Nearest Neighbour CC - Cubic Convolution S8 - 8-points (sin x)/x DS8 - 8-points damped (sin x)/x S16 - 16-points (sin x)/x DS16 - 16-points damped (sin x)/x	NONE$$$$$$$$$$$$
46		1553	1568	A16	Map projection identifier NONE - none	NONE$$$$$$$$$$$$
47		1569	1584	A16	Product level indicator	LEVEL$2$$$$$$$$
48		1585	1600	I16	Number of Map Projection ancillary records	$$$$$$$$$$$$$$$0
49		1601	1616	I16	Number of GCP anc. records	$$$$$$$$$$$$$$$0
50		1617	1632	I16	Number of Orbit/Attitude anc. records 2 ILT records plus 1 orbit & attitude record	$$$$$$$$$$$$$$$3
51		1633	1648	I16	Number of all other records in Leader File Radiometric correction related records (optical thickness, radiometric correction parameter, data scale & histogram) and others (file descriptor, header, CRT documentation)	$$$$$$$$$$$$$$18
52		1649	1712	A64	Active bands One byte per band, maximum of 64 bands where the n'th byte is set to 1 if the band is active, and to 0 otherwise.	
53		1713	1728	A16	Interleaving indicator	LINN$$$$$$$$$$$$
54	*	1729	1744		Geographic ancillary information indicator (Y/N):	
54-1		1729		A1	Earth Location Data in Suffix	Y
54-2		1730		A1	Sun Angles in Suffix	Y
54-3		1731		A1	Satellite Angles in Suffix	Y
54-4		1732		A1	Latitude/Longitude grid in Pad bit #3 of Band 5	Y
54-5		1733		A1	Spare	
54-6		1734		A1	Spare	
54-7...16		1735	1744	A1	Blank	Blank

55	1745	1760	I16	Radiometric resolution designator of Band 1	$$$$$$$$$$$$$$8
56	1761	1776	I16	Radiometric resolution designator of Band 2	$$$$$$$$$$$$$$8
57	1777	1792	I16	Radiometric resolution designator of Band 3	$$$$$$$$$$$$$$8
58	1793	1808	I16	Radiometric resolution designator of Band 4	$$$$$$$$$$$$$$4
59	1809	1824	I16	Radiometric resolution designator of Band 5	$$$$$$$$$$$$$$8
60	1825	1840	I16	Radiometric resolution designator of Band 6	$$$$$$$$$$$$$$8
61	1841	1856	I16	Radiometric resolution designator of Band 7	$$$$$$$$$$$$$$8
62	1857	1872	I16	Radiometric resolution designator of Band 8	$$$$$$$$$$$$$$8
63	1873	1888	I16	Radiometric resolution designator of Band 9	$$$$$$$$$$$$$$8
64	1889	1904	I16	Radiometric resolution designator of Band 10	$$$$$$$$$$$$$$8
65	1905	1920	I16	Radiometric resolution designator of Band 11	$$$$$$$$$$$$$$8
66	1921	1936	I16	Radiometric resolution designator of Band 12	$$$$$$$$$$$$$$8
67	1937	1952	I16	Number of CRT documentation ancillary records	$$$$$$$$$$$$$$1
68	1953	1968	I16	Number of ozone optical thickness ancillary records	$$$$$$$$$$$$$$1
69	1969	1984	I16	Number of molecular scattering optical thickness ancillary records	$$$$$$$$$$$$$$1
70	1985	2000	I16	Number of radiometric correction parameter records	$$$$$$$$$$$$$$1
71	2001	2016	I16	Number of data scale & histogram records	$$$$$$$$$$$$$$12
72	2017	2020	I4	Version number of the processing of this scene	
73	2021	3800		Blanks	Blanks

IMAGERY_VOLUME
LEADER_FILE
CRT_DOCUMENTATION_RECORD

Field or Field Group Name		Start Byte	Last Byte	Format	Description and Explanation	Content
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record sequence number	3
2		5		B1	File code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	11
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	CRT Documentation Record sequence number	$$$1
8		17	20	A4	Blanks	$$$$
CRT_DOC_SEGM	*	21	1560		CRT Documentation Segment	
9		21	22		Physical Record Number (MSB 12 bits;binary integer) and Spares(LSB 4 bits; set to 0)	
10		23			File Control (MSB 2 bits) Record I.D. (LSB 6 bits;binary integer) 1 = leading documentation file 2 = trailing documentation file	
11		24		B1	Valid Data Flag 0(all bits off) = data is invalid 255(all bits on) = data is valid	
12		25	27	3B1	Target Area Code	
13		28		B1	File Number contained in the tape according to NASA tape format	
14	•	29	32	B4	Tape Sequence Number contained in NASA Standard Header Record	
15		33	36	B4	Film Frame Number	
16		37	38	B2	Starting Year Number For example,1978	
17		39	40	B2	Starting GMT Day Number Starts at 1 on Jan.1 and increments by 1 for each day of the year (1 to 366)	
18		41	44	B4	Starting Time in Milliseconds GMT. This number is in milliseconds of the GMT,and for the start of the CRTT data file	
19		45	48	B4	Increment in Milliseconds from the start time of the segment to the last data scan of the segment.	
20		49	50	B2	Orbit Number	
21		51	52	B2	Number of Scans	
22		53	54	B2	Geodetec Latitude Center ranging from 0 at the south pole to 18000(180 deg.*100) at the north pole (LSB weight is 0.01 deg)	
23		55	56	B2	Longitude Center from 0 at the Greenwich Meridian eastward to 36000 (360 deg.*100) (LSB weight is 0.01 deg)	
24		57	58	B2	Geodetic Latitude of Corner(left of truck,first in time), with scaling identical to field 14.	

25	59	60	B2	Longitude of Corner (left of truck,first in time), with scaling identical to field 15.
26	61	62	B2	Geodetic Latitude of Corner(right of truck,first in time), with scaling identical to field 14.
27	63	64	B2	Longitude of Corner (right of truck,first in time), with scaling identical to field 15.
28	65	66	B2	Geodetic Latitude of Corner(left of truck,las. in time), with scaling identical to field 14.
29	67	68	B2	Longitude of Corner (left of truck,last in time) with scaling identical to field 15.
30	69	70	B2	Geodetic Latitude of Corner(right of truck,last in time), with scaling identical to field 14.
31	71	72	B2	Longitude of Corner (right of truck,last in time) with scaling identical to field 15.
32	73			ILT FLAGS Bit 1(MSB) 0 = at least one set of data not available 1 = all relevant data available Bit 2 1 = time corrections available Bit 3 1 = solar ephemeris available Bit 4 1 = data quality loss available Bit 5 1 = VIP data available Bit6-7 00 = spacecraft ephemeris not available 01 = spacecraft ephemeris predicteve 11 = spacecraft ephemeris definitive Bit 8 1 = rate coefficients available
33	74			Parameter Presence Code Bit 1(MSB) 1 = Ch.1 data is present 0 = Ch.1 data is absent Bit 2 1 = Ch.2 data is present 0 = Ch.2 data is absent Bit 3 1 = Ch.3 data is present 0 = Ch.3 data is absent Bit 4 1 = Ch.4 data is present 0 = Ch.4 data is absent Bit 5 1 = Ch.5 data is present 0 = Ch.5 data is absent Bit 6 1 = Ch.6 data is present 0 = Ch.6 data is absent Bit 7-8 Spare 0
34	75	76	B2	Number of Missing Scans
35	77	78	B2	Number of Scans Missing Ch.1 data
36	79	80	B2	Number of Scans Missing Ch.2 data
37	81	82	B2	Number of Scans Missing Ch.3 data
38	83	84	B2	Number of Scans Missing Cn.4 data
39	85	86	B2	Number of Scans Missing Ch.5 data
40	87	88	B2	Number of Scans Missing Ch.6.data
41	89		B1	Algorithm I.D.Number of Ch.1 Calibration
42	90		B1	Algorithm I.D.Number of Ch.2 Calibration
43	91		B1	Algorithm I.D.Number of Ch.3 Calibration
44	92		B1	Algorithm I.D.Number of Ch.4 Calibration
45	93		B1	Algorithm I.D.Number of Ch.5 Calibration
46	94		B1	Algorithm I.D.Number of Ch.6 Calibration
47	95		B1	Algorithm I.D.Number of Geographic Location

25	59	60	B2	Longitude of Corner (left of truck,first in time), with scaling identical to field 15.
26	61	62	B2	Geodetic Latitude of Corner(right of truck,first in time), with scaling identical to field 14.
27	63	64	B2	Longitude of Corner (right of truck,first in time), with scaling identical to field 15.
28	65	66	B2	Geodetic Latitude of Corner(left of truck,last in time), with scaling identical to field 14.
29	67	68	B2	Longitude of Corner (left of truck,last in time) with scaling identical to field 15.
30	69	70	B2	Geodetic Latitude of Corner(right of truck,last in time), with scaling identical to field 14.
31	71	72	B2	Longitude of Corner (right of truck,last in time) with scaling identical to field 15.
32	73			ILT FLAGS Bit 1(MSB) 0 = at least one set of data not available 1 = all relevant data available Bit 2 1 = time corrections available Bit 3 1 = solar ephemeris available Bit 4 1 = data quality loss available Bit 5 1 = VIP data available Bit6-7 00 = spacecraft ephemeris not available 01 = spacecraft ephemeris predicteve 11 = spacecraft ephemeris definitive Bit 8 1 = rate coefficients available
33	74			Parameter Presence Code Bit 1(MSB) 1 = Ch.1 data is present 0 = Ch.1 data is absent Bit 2 1 = Ch.2 data is present 0 = Ch.2 data is absent Bit 3 1 = Ch.3 data is present 0 = Ch.3 data is absent Bit 4 1 = Ch.4 data is present 0 = Ch.4 data is absent Bit 5 1 = Ch.5 data is present 0 = Ch.5 data is absent Bit 6 1 = Ch.6 data is present 0 = Ch.6 data is absent Bit 7-8 Spare 0
34	75	76	B2	Number of Missing Scans
35	77	78	B2	Number of Scans Missing Ch.1 data
36	79	80	B2	Number of Scans Missing Ch.2 data
37	81	82	B2	Number of Scans Missing Ch.3 data
38	83	84	B2	Number of Scans Missing Cn.4 data
39	85	86	B2	Number of Scans Missing Ch.5 data
40	87	88	B2	Number of Scans Missing Ch.6.data
41	89		B1	Algorithm I.D.Number of Ch.1 Calibration
42	90		B1	Algorithm I.D.Number of Ch.2 Calibration
43	91		B1	Algorithm I.D.Number of Ch.3 Calibration
44	92		B1	Algorithm I.D.Number of Ch.4 Calibration
45	93		B1	Algorithm I.D.Number of Ch.5 Calibration
46	94		B1	Algorithm I.D.Number of Ch.6 Calibration
47	95		B1	Algorithm I.D.Number of Geographic Location

48	96		B1	Undefined	
49	97	100	B4	Decom Run Number	
50	101	104	B4	Decom Reel Number	
51	105	106	B2	Number of HDT Sync Losses occered reading 2 minutes period of the HDT tape	
52	107	108	B2	Number of HDT Parity Errors detected on the HDT tape during the 2 minutes period.	
53	109	110	B2	Number of WBVT Sync Losses detected by the pre-processor during generation of 2 minutes period of HDT tape.	
54	111	112	B2	Number of WBVT Bit Slip Occurences detected by the pre-processor during generation of 2 minutes period of HDT tape.	
55	113	176	32B2	Sub-Commutated 32 Housekeeping Data,scaled with 8 fractional bits	
56	177			Spare	0
57	178			Base Plate Temperature Flag 0(all bits off) = baseplate temperature is a normal preset value 255(all bits on) = temperature is obtained from the ILT	
58	179	180	B2	Baseplate Temperature This data has a fractional part of 7 bits.	
59	181	716		Spares	Blanks
60	717		B1	CZCS gain setting A binary integer value of 1,2,3 or 4	
61	718		B1	CZCS Threshold Function Status 1 = off, 2 = on	
62	719	720	B2	CZCS Tilt Angle Two's complement integer,with LSB weight of 1/1000 deg.	
63	721	722	B2	The year(4 digit) associated with the geographic scene center.	
64	723	724	B2	Scene Center Day of Year (1 to 366)	
65	725	728	B4	The Milliseconds of Day associated with the geographic center of the scene(0 to 86399999)	
66	729	730	B2	Solar Elevation at the Geographic Scene Center Values range from -90 to +90 deg.,represented by two's complement integer,with LSB weight of 1/100 deg.	
67	731	732	B2	Solar Azimuth at the Geographic Scene Center Values range from 0 to 360 deg. Unsigned binary integer,with LSB weight 1/100 deg.	
68	733	738	3B2	The Spacecraft Attitude(Roll,Pitch and Yaw) at the Geographic SCENE Center. Values range from -32 to +32 deg.,represented by two's complement integer,with LSB weight of 1/1000 deg.	
69	739		B1	Tick Label Flag for the Top/Bottom Edges 1 = tick labels are latitude 2 = tick labels are longitude	
70	740		B1	Tick Label Flag for the Left/Right Edges 1 = tick labels are latitude 2 = tick labels are longitude	

71	741	742	B2	Latitude of Top Left Tick Label Values range from 0 deg. at the south pole to 180 deg. at the north pole. Unsigned binary integer,with LSB weight of 1/100 deg.
72	743	744	B2	Latitude of Top Right Tick Label
73	745	746	B2	Latitude of Bottom Left Tick Label
74	747	748	B2	Latitude of Bottom Right Tick Label
75	749	750	B2	Longitude of Left Top Tick Label Values range from 0 to 360 deg.eastward. Unsigned binary integer,with LSB weight of 1/100 deg.
76	751	752	B2	Longitude of Left Bottom Tick Label
77	753	754	B2	Longitude of Right Top Tick Label)
78	755	756	B2	Longitude of Right Bottom Tick Label
79	757		B1	Top Tick Increments in degrees between successive ticks on each edge of the scene. Values may be 1,2,4 or 8 deg. Unsigned binary integers,with LSB weight of 1 deg.
80	758		B1	Bottom Tick Increments
81	759		B1	Left Tick Increments
82	760		B1	Right Tick Increments
83	761	814	27B2	Top Tick Location Arrays The location of the first tick is specified relative to the left end of the edge; the location of succeeding tick is specified relative to the position of the preceeding tick. Values are unsigned binary integers,representing numbers of pixels.
84	815	868	27B2	Bottom Tick Location Arrays
85	869	922	27B2	Left Tick Location Arrays The location of the first tick is specified relative to the top end of the edge; the location of succeeding tick is specified relative to the position of the proceeding tick. Values are unsigned binary integers, representing numbers of scan lines.
86	923	976	27B2	Right Tick Location Arrays
87	977	984	2B4	Slope and Intercept of Ch.1 for the conversion of the ch.1 data to radiometric units (mw/cm**2-ster-um) Signed and 7 bits whole part and 24 bits fractional.
88	985	992	2B4	Spope and Intercept of Ch.2
89	993	1000	2B4	Slops and Intercept of Ch.3
90	1001	1008	2B4	Slope and Intercept of Ch.4
91	1009	1016	2B4	Slope and Intercept of Ch.5
92	1017	1024	2B4	Slope and Intercept of Ch.6
93	1025	1536	256B2	Temperature Conversion Table Contains the temperature in degrees Celsius for the corresponding count of ch.6 data. This data has 8 bits whole part and 8 bits fractional part.

94	1537	1540	282	Image Enhancement Slope and Intercept of Ch.1 for display purpose, represented by two's complement integers. LSB weights are 1/256 for slopes and 1/16 for intercepts.	
95	1541	1544	282	Image Enhancement Slope and Intercept of Ch.2	
96	1545	1548	282	Image Enhancement Slope and Intercept of Ch.3	
97	1549	1552	282	Image Enhancement Slope and Intercept of Ch.4	
98	1553	1556	282	Image Enhancement Slope and Intercept of Ch.5	
99	1557	1560	282	Image Enhancement Slope and Intercept of Ch.6	
100	1561	3800		Spares	Blanks

IMAGERY_VOLUME
LEADER_FILE
ILT_RECORD

Field or Field Group Name		Start Byte	Last Byte	Format	Description and Explanation	Content
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record sequence number (4 to 5)	
2		5		B1	File code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	41
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	CRT Documentation Record sequence number ($$$1 to $$$2)	
8		17	20	A4	Blanks	$$$$
ILT_TYPA_SEGM	*	21			CZCS ILT Type A Record	
9		21	22		Physical Record Number(MSB 12 bits) and Spares (set to 0)	
10		23			Record I.D. Bit 1(MSB)-2 File Status Bit Bit 3-8 01 = Type A data record 02 = Data quality loss record 03 = Type A dummy record 11 = Tppe B data record(SOBV/TOMS) 13 = Type B dummy record 06 = Type D data record(SAM II) 31 = Time correction record	
11		24	26	B3	Data Orbit Number	
12		27		B1	GMT Year (last 2 digits only) corresponding to the data contained in item 17 thru 29	
13		28	29	B2	GMT Start Time of Year expressed in units of 2 hours(1/12 of a day) corresponding the data contained in item 17 thru 29	
14		30	32	B3	GMT Start Milliseconds of 1/12 day corresponding the data contained in item 17 thru 29	
15		33	35	B3	Spacecraft Time given in 1/12 days to be added to spacecraft time to get the corresponding spacecraft time for the associated data in item 17 thru 29. (MSB will be used as the sign bit)	
16		36	38	B3	Spacecraft Clock Time in milliseconds to be added to spacecraft 1/12 days above to get the corresponding time for the associated data in item 17 thru 29. (MSB will be used as the sign bit)	
17		39	41	B3	X co-ordinate of spacecraft location (in earth centered inertial co-ordinates true of date) Expressed in meters.	
18		42	44	B3	Y co-ordinate of spacecraft location	
19		45	47	B3	Z co-ordinate of spacecraft location	
20		48	50	B3	Greenwich Hour Angle from Aries	

				The angle between the inertial X-axis and the earth fixed x-axis,expressed in 10^{-6} radians.
21		51	53	B3 The X-component of the spacecraft velocity in km/second scaled by 2^{18}. The MSB will be used as the sign bit.
22		54	56	B3 The Y-component of the spacecraft velocity
23		57	59	B3 The Z-component of the spacecraft velocity If S/C ephemeris data is not available,each 24bits of items 17 thru 23 will be left at its initial value of 5777777777_8.
24		60	65	B6 Sun Right Ascension(Azimuth) The angle measured in the plane of the equator from vernal equinox to a plane normal to the equator containing the sun(true of date) and positive counterclockwise as seen from +Z(north pole). Expressed as two 24 bit words. The first 24 bits(X1) will be radians scaled by 221. The second 24 bit(x2) word will be radians scaled by 229. To get 29 bit precision, Y let Y = X1+x2 if X1>0 ; Y = X1-X2 if X1<0 If solar ephemeris data is not available, each 24 bits is left at its initial value=5777777777_8
25		66	71	B6 Sun Declination(Elevation) The angle between the sun and the inertial equator measureed in a plane normal to the inertial equator containing the sun and the earth center (true of date), positive above equator. Same scaling as item 107. If solar ephemeris data is not available, each 24 bits is left at its initial value = 5777777777_8
26		72	74	B3 Sub-satellite Longitude East longitude of normal from spacecraft to ellipsoid,expressed in 10^{-6} radians. Equatorial radius = 6378.144km Polar radius = 6356.759km
27		75	77	B3 Sub-satellite Geocentric Latitude
28		78	80	B3 Altitude The distance from the spacecraft to ellipsoid measured along the normal,expressed in meters. If S/C ephemeris is not available, each 24 bits of item 26 thru 28 is left at its initial value = 5777777777_8.
29		81	83	B3 Spacecraft Day/Twilight/Night Status 0 = Day (Spacecraft & subtract point both illuminated 1 = Twilight (Spacecraft illuminated,sabtract point in shade) 2 = Night (Spacecraft & Subtract point both in shade)
30		84	128	Repeat of item 17 to 29 for 60 GMT seconds

				after the GMT given in item 12 thru 14.	
31		128	173	Repeat of item 17 to 29 for 120 GMT seconds after the GMT given in item 12 thru 14,but only if 3 minutes of ephemeris data coincide with the 2 minutes 8 secondstime period contained in this record. Otherwise, each 24 bits will be 5777777_8.	
32		174	176	B3 GMT(MS) of Start of First VIP Major Frame This is given as increment in milliseconds from the time given in item 12-14. This number will always negative except when ILT data record starts exactly on the GMT integer minutes. It may cause the day count to change.	
33		177	179	B3 Spacecraft Time(1/12 Days) of Start of First VIP Major Frame to be added to the next 24-bit word (item 34). This may be negative and may cause the day count to change.	
34		180	182	B3 Spacecraft Time(MS) of Start of First VIP Major Frame to be added to the item 33. This provides the start time of data which follows in item 35 thru 47. If this word is negative,no VIP data was available. The MSB will be used as the sign bit.	
35		183	202	VIP Major Frame Q/C	
36		203		Spare	11111111_2
37		204	227	Sensor-Spacecraft Status	
38		228	239	THIR Housekeeping Data	
39		240	244	LIMS Housekeeping Data	
40		245		B1 CZCS Baseline Temperature The value is in raw counts	
41		246	248	Spacecraft Pitch Bit 1(MSB)-2 ; source code 00 = ACS data only 01 = ACS and DSAS data 10 = No ACS data(No VIP Data) In this case,entire 24 bits are set to 5777777_8. 11 = Pitch bias inserted Bit 3-24 ; Signed binary integer radian value multiplied by 10^6.	
42		249	251	Spacecraft Yaw	
43		252	254	Spacecraft Roll	
44		255	257	Spacecraft Pitch Rate Bit 1(MSB)-2 ; 00 = Normal Computation 01 = Not Computed because of gating 11 = Not computed because CZCS turned on or off about this time. 10 = Not computed because no ACS data was available Bit 3-24 ; Rate of change of S/C pitch. Signed binary integer radians per second multiplied by 10^6.	

45	258	260		Spacecraft Roll Rate
46	261	263	B3	DSAS Declination to Sun (Azimuth Angle) Tenth-of-degrees relative to the S/C axes,and ranges from -1800 to 1800 with negative values for sun directions to the left of S/C track(-Y hemisphere). The azimuth angle is zero when sun direction is aligned with S/C XZ-plane. Set to 5777777777_8 if no data is available.
47	264	266	B3	DSAS Declination to Sun (Elevation Angle) Tenth-of-degrees relative to the S/C axes,and range from -1800 to 1800 with positive values corresponding to sun directions below the S/C XY-plane(+Z hemisphere). Set to 5777777777_8 if no data is available.
48	267	581		15 additional sets of item 41 thru 47 for a total of 16 sets. Each set is for 1 spacecraft second after previous set(next second).
49	582	3416		7 additional sets of items 33 thru 48 for a total of 8 sets for 2 min.8 sec of coverage.
50	3417	3419	B3	Start Data Quality Loss Time The start time of an interval contained in this 2 min.8 sec period,where data quality loss has occurred,expressed as a GMT(milliseconds) increment from time given in item 32. The value should be multiples of 40 milliseconds.
51	3420	3422	B3	End Data Quality Loss Time The end time(milliseconds increment from time in item 32) of the data quality loss interval descrived above.
52	3423	3788		61 additional pairs of data quality loss intervals as descrived in item 50 and 51. Filled with 24 bit word 5777777777_8 if no more intervals)
53	3789	3791		Data Quality Loss IntervalCount,and Next Record Flag Bit1(MSB)-12 ; Integer value indicating number of valid bit slip intervals in this record.(binary integer) Bit13-24 ; Next Data Flag
54	3792	3794		Input Data Flags giving the information about the six sources of input data used to generate this record. Bit1(MSB)-2 ; Time Corrections 00 - No, 01 - Yes Bit 3-4 ; Solar Ephemeris 00 - No, 01 - Yes Bit 5-6 ; Data Quality Loss Information 00 - No, 01 - Yes Bit 7-8 ; UFO-ILT(VIP data & SAM II data) 00 - No, 01 - Yes Bit 9-10 ; Spacecraft Ephemeris 00 - No, 01 - Predictive, 11 - Definitive Bit 11-12 ; Rate Coefficients 00 - No, 01 = Yes

55	3795	3797	Stripper Information Flag
56	3798	3800	CHECKSUM Result of adding all previous 24 bit words together.

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 6

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	13
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	536		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$3
10		23	24	A2	Blanks	
11		25	536	25682	Temperature conversion table Contains the temperature in degree Celsius for the corresponding count of Ch.6 data. This data has 8 bits whole and 8 bits fractional part.	
HIST_DAT_SEGM	*	537	1560		HISTOGRAM DATA SEGMENT	
12		537	1560	25684	Histogram value of Ch.6 (from level 0 to level 255)	
13		1561	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 5

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	12
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	60		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	56	2E16.8	Slope and intercept for conversion of the data value to reflectance	
12		57	60	I4	Threshold data value to distinguish land and cloud area	
HIST_DAT_SEGM	*	61	124		HISTOGRAM DATA SEGMENT	
13		61	124	1684	Histogram value of Ch.5 (from level 0 to level 15)	
14		125	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD (1 to 4)

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number(8 to 11)	
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number ($$$1 to $$$4)	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	80		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	56	2E16.8	Slope and intercept for conversion of the data value to the rayleigh corrected reflectance	
12		57	64	I8	Number of water pixels	
13		65	80	F16.8	Percentage of water pixels	
14		81	88	I8	Number of satured water pixels	
15		89	104	F16.8	Percentage of satured water pixels	
					HISTOGRAM DATA SEGMENT	
14		105	1128	25684	Histogram value of Ch.i (i ; 1 to 4) water pixels (from level 0 to level 255)	
15		1129	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
RADIOMETRIC_CORRECTION_PARAMETER_RECORD

field or field_group name	start byte	stop byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM *	1	20		RECORD IDENTIFICATION SEGMENT	
1	1	4	B4	Record Sequence Number	9
2	5		B1	File Code (according to CEOS definition)	10
3	6		B1	Record Code (according to CEOS definition)	60
4	7		B1	Mission Code (according to CEOS definition)	22
5	8		B1	Origin Code (according to CEOS definition)	50
6	9	12	B4	Length of this record	3800
7	13	16	I4	Radiometric Correction Parameter Record sequence number	$$$1
8	17	20	A4	Blanks	$$$$
W/L/C_DISC_PAR *	21	24		WATER/LAND/CLOUD DISCRIMINATION PARAMETER	
9	21		B1	Threshold value of channel 5 for indetifying water pixels	
10	22		B1	Threshold value of channel 5 for discrimination of land and cloud	
11	23		B1	Threshold value of channel 4 water pixels saturation	
12	24		A1	Blank	
RAD_PAR *	25	756		RADIOMETRIC CALIBRATION PARAMETER	
CAL_PAR *	25	248		CALIBRATION PARAMETER	
13 .	25	56	A32	Parameter Identification	
14	57	88	2F16.8	Slope and intercept of ch.1 (in mw/cm^2-ster-μm)	
15	89	120	2F16.8	Slope and intercept of ch.2	
16	121	152	2F16.8	Slope and intercept of ch.3	
17	153	184	2F16.8	Slope and intercept of ch.4	
18	185	216	2F16.8	Slope and intercept of ch.5	
19	217	248	2F16.8	Slope and intercept of ch.6	
ADJ_PAR *	249	344		ADJUST PARAMETER	
20	337	340	I4	Tilt	
21	341	344	I4	Gain	
SEN_DEC_PAR *	345	756		SENSITIVITY DECAY PARAMETER	
22	345	376	A32	Sensitivity decay model type	
23	377	436	A60	Description of the function	
24	437	496	A60	Description of the variable	
25	497	528	2E16.8	Coefficient C_a, C_b of ch.1	
26	429	560	2E16.8	Coefficient C_a, C_b of ch.2	
27	461	592	2E16.8	Coefficient C_a, C_b of ch.3	
28	593	624	2E16.8	Coefficient C_a, C_b of ch.4	
29	625	756		Blanks	
ATM_COR_PAR *	757	3388		ATMOSPHERIC CORRECTION PARAMETER	
COM_PAR *	757	1128		COMMON PARAMETER	
30	757	772	F16.8	Mean extraterrestial solar irradiance of ch.1 (in mw/cm^2-ster-μm)	
31	773	788	F16.8	Mean extraterrestial solar irradiance of ch.2 (in mw/cm^2-ster-μm)	

32	789	804	F16.8	Mean extraterrestial solar irradiance of ch.3 (in mw/cm^2-ster-μm)
33	805	820	F16.8	Mean extraterrestial solar irradiance of ch.4 (in mw/cm^2-ster-μm)
34	821	836	F16.8	Eccentricity of the Earth's orbit
35	837	838	I2	Rayleigh optical thickness calculation flag $1 = ECMWF pressure data present and used for processing $2 = ECMWF pressure data present but not used for processing $3 = ECMWF pressure data not present
36	839	840	I2	Ozone optical thickness calculation flag $1 = TOMS ozone data present and used for processing $2 = TOMS ozone data present but not used for processing $3 = TOMS ozone data not present
37	841	856	F16.8	Rayleigh optical thickness of ch.1 at P=1013.3hPa
38	857	872	F16.8	Rayleigh optical thickness of ch.2 at P=1013.3hPa
39	873	888	F16.8	Rayleigh optical thickness of ch.3 at P=1013.3hPa
40	889	904	F16.8	Rayleigh optical thickness of ch.4 at P=1013.3hPa
41	905	920	F16.8	Gasabsorbtion of ch.1 (not Ozone)
42	921	936	F16.8	Gasabsorbtion of ch.2 (not Ozone)
43	937	952	F16.8	Gasabsorbtion of ch.3 (not Ozone)
44	953	968	F16.8	Gasabsorbtion of ch.4 (not Ozone)
45	969	984	F16.8	Ozone optical thickness of ch.1 at 340 matm cm
46	985	1000	F16.8	Ozone optical thickness of ch.2 at 340 matm cm
47	1001	1016	F16.8	Ozone optical thickness of ch.3 at 340 matm cm
48	1017	1032	F16.8	Ozone optical thickness of ch.4 at 340 matm cm
49	1033	1048	F16.8	Refractive index of water of ch.1
50	1049	1064	F16.8	Refractive index of water of ch.2
51	1065	1080	F16.8	Refractive index of water of ch.3
52	1081	1096	F16.8	Refractive index of water of ch.4
53	1097	1112	F16.8	Ratio of upwelling irradiance to radiance
54	1113	1128	F16.8	Fresnel coefficient of the sea surface averaged over all angles
RAY_COR_PAR *	1129	1164		RAYLEIGH CORRECTION PARAMETER
55	1129	1160	A32	Rayleigh correction type
56	1161	1162	I2	Correction method indicator $1 = single scattering correction $2 = multiple scattering correction $3 = special
57	1163	1164	A2	Blanks
REF_MOD_PAR *	1165			REFLECTANCE MODEL PARAMETER
58	1165	1196	A32	Aerosol correction algorithm type
59	1197	1260	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_1)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
60	1261	1324	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_2)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
61	1325	1388	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_3)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
62	1389	1452	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_4)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
63	1453	1516	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_1)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
64	1516	1580	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_2)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
65	1581	1644	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_3)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$

66	1645	1708	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_4)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
67	1709	1724	F16.8	Threshold value of the pigment concentration (mg/m^3) for use of the ratio of $R(\lambda_2)$ to $R(\lambda_3)$ In case of no use of $R(\lambda_2) / R(\lambda_3)$ equations, set to 100.0
68	1725	1784	A60	Description of the function which calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
69	1785	1844	A60	Description of the variable for case II water where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
70	1845	1846	I2	Index to the band to be used to calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
71	1847	1878	2F16.8	Two coefficients α and γ where ratio $(R(\lambda_1) / R(\lambda_3))$ is used
72	1879	1938	A60	Description of the function which calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
73	1939	1998	A60	Description of the variable for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
74	1999	2000	I2	Index to the band to be used to calculates $R(\lambda_4)$ for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
75	2001	2032	2F16.8	Two coefficients α and γ for case II water where ratio $(R(\lambda_2) / R(\lambda_3))$ is used
76	2033	2048	F16.8	Threshold value of $R(\lambda_1)$ for use of ratio $R(\lambda_2) / R(\lambda_3)$ In case of no use of $R(\lambda_2) / R(\lambda_3)$ equations, set to 100.0
77	2049	3000		Blanks
WAT_DESC_PAR *	3001	3144		CASE I AND CASE II WATER DISCRIMINATION PARAMETER
78	3001	3064	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln \lim R(\lambda_3)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
79	3065	3128	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln \lim R(\lambda_3)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
80	3129	3144	F16.8	Threshold value of the pigment concentration (mg/m^3) for use of the ratio of $R(\lambda_2)$ to $R(\lambda_3)$ In case of no use of $R(\lambda_2) / R(\lambda_3)$ equations, set to 100.0
ITER_CALC_PAR *	3145	3216		ITERATION CALCULATION PARAMETER
81	3145	3160	F16.8	Initial value of Angstrom exponent
82	3161	3176	F16.8	Initial value of $R(\lambda_4)$
83	3177	3192	F16.8	Acceptance criteria of convergence of Angstrom exponent calculation δ_v
84	3193	3196	I4	Iteration limit number of Angstrom exponent calculation
85	3197	3212	F16.8	Acceptance criteria of convergence of $R((\lambda_4)$ calculation $\delta R(\lambda_4)$
86	3213	3216	I4	Iteration limit number of $R(\lambda_4)$ calculation
GEO_PROC_PAR *	3217	3656		GEOPHYSICAL PROCESSING PARAMETER
87	3217	3248	A32	Case I water pigment concentration derivation algorithm type
88	3249	3312	4F16.8	4 coefficients of polynomial equation for derivation of pigment concentration case I water $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln C$, C: pigment concentration (mg/m^3), $X = \ln (R(\lambda_1) / R(\lambda_3))$
89	3313	3376	4F16.8	4 coefficients of polynomial equation for derivation of pigment concentration case I water $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where $Y = \ln C$, C: pigment concentration (mg/m^3), $X = \ln (R(\lambda_2) / R(\lambda_3))$
90	3377	3408	A32	Case II water pigment concentration derivation algorithm type
91	3409	3468	A60	Description of the function
92	3469	3528	A60	Description of the parameter

93	3529	3592	4F16.8	4 coefficients for derivation of pigment concentration for case II water using ration ($R(\lambda_1) / R(\lambda_3)$)
94	3593	3656	4F16.8	4 coefficients for derivation of pigment concentration for case II water using ratio ($R(\lambda_2) / R(\lambda_3)$)
95	3657	3800		Blanks

IMAGERY_VOLUME
LEADER_FILE
ORBIT_AND_ATTITUDE_DATA_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record sequence number	6
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	40
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Record length	3800
7		13	16	I4	Orbit /Attitude ancillary record sequence number	$$$1
8		17	20	A4	Blanks	Blanks
9		21	24	I4	Number of ephemeris data sets (up to $$$3)	
10		25	28	I4	Number of attitude data sets (up to $$31)	
11	*	29	32		Flag indicating valid information of this record	
12		29		A1	$ or 1 if S/C ephemeris is available or not S/C ephemeris:S/C location,Greenwich hour angle from aries,S/C velocity sub satellite latitude and longitude,altitude	
13		30		A1	$ or 1 if solar ephemeris is available or not solar ephemeris:sun azimuth, sun elevation	
14		31		A1	$ or 1 if attitude data is available or not	
15		32		A1	$ or 1 if attitude rate data is available or not	
16		33	40	I8	Orbit number	
17		41	56	I16	Epoch year and day of year (YYYYDDD)	
EPHE DAT SEGM	*				Ephemeris Data Segment 1	
18		57	72	I16	Epoch time within day(msec)	
19		73	88	F16.8	X-position component(km)	
20		89	104	F16.8	Y-position component(km)	
21		105	120	F16.8	Z-position component(km)	
22		121	136	F16.8	X-velocity component(km/sec)	
23		137	152	F16.8	Y-velocity component(km/sec)	
24		153	168	F16.8	Z-velocity component(km/sec)	
25		169	184	F16.8	Greenwich hour angle from Aries (degrees)	
26		185	200	F16.8	Sub satellite latitude in degrees	
27		201	216	F16.8	Sub satellite longitude in degrees	
28		217	232	F16.8	Altitude(km)	
EPHE DAT SEGM	*	233	408		Ephemeris Data Segment 2	
EPHE DAT SEGM	*	409	584		Ephemeris Data Segment 3	
					Ephemeris data is given every one minutes	
ATTI DAT SEGM	*	585	680		Attitude Data Segment 1	
29		585	600	I16	Epoch time within day (msec)	
30		601	616	F16.8	Pitch (degree)	
31		617	632	F16.8	Yaw (degree)	
32		633	648	F16.8	Roll (degree)	

33		649	664	F16.8	Pitch rate (degree/sec)
34		665	680	F16.8	Roll rate (degree/sec)
ATTI DAT SEGM	*	681	3560		Attitude Data Segment 2 to 31
					Attitude data is given every 4 seconds
35		3561	3800		Blanks Blanks

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD (7 to 9)

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number(14 to 16)	
2		5		B1	File Code	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
		13	16	I4	Data scale and histogram record sequence number ($$$1 to $$$3)	
7		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	128		DATA SCALE SEGMENT	
8		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
9		23	24	A2	Blanks	
10		25	56	2E16.8	Slope and intercept for conversion of the data value to the water leaving reflectance	
11		57	64	I8	Number of case I water pixels	
12		65	80	F16.8	Percentage of case I water pixels	
13		81	88	I8	Number of case II water pixels	
14		89	104	F16.8	Percentage of case II water pixels	
15		105	112	I8	Number of unprocessable water pixels (band 4 data saturation, unconvergence of iteration calculation, etc.)	
16		113	128	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	129	1152		HISTOGRAM DATA SEGMENT	
17		129	1152	25684	Histogram value of Ch.i (i ; 7 to 9) water pixels (from level 0 to level 255)	
18		1153	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 10

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	17
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8					($$$1 to $$$4)	
9		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21			DATA SCALE SEGMENT	
10		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
11		23	24	A2	Blanks	
12		25	56	2E16.8	Slope and intercept for conversion of the data value to the erosol reflectance for case I water	
13		57	64	I8	Number of case I water pixels	
14		65	80	F16.8	Percentage of case I water pixels	
15		81	88	I8	Number of unprocessable water pixels	
16		89	104	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	185	1128		HISTOGRAM DATA SEGMENT	
17		105	1128	25684	Histogram value of Ch.10 case I water pixels (from level 0 to level 255)	
18		1129	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 11

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	18
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	88		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	40	2E16.8	Slope and intercept for conversion of the data value to the angstrom exponent for case I water	
12		41	48	I8	Number of case I water pixels	
13		49	64	F16.8	Percentage of case I water pixels	
14		65	72	I8	Number of unprocessable water pixels	
15		73	88	F16.8	Percentage of unprocessable pixels	
HIST_DAT_SEGM	*	89	1112		HISTOGRAM DATA SEGMENT	
16		89	1112	25684	Histogram value of Ch.11 for case one water pixels (from level 0 to level 255)	
17		1113	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 12

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	19
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	164		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$2
10		23	24	A2	Blanks	
11		25	56	2F16.8	2 coefficients of the equation 1 C = exp((DN-a1)/a2) where C : pigment concentration(mg/m3) DN : data value of band 12	
12		57	88	2F16.8	2 coefficients of the equation 2 C = exp((DN-a1)/a2) where C : pigment concentration(mg/m3) DN : data value of band 12	
13		89	92	I4	Threshold value of DN to use equation 2 (If DN is larger(smaller) than this threshold value, equation 2(1) must be used to calculate C from DN)	
14		93	100	I8	Number of case I water pixels	
15		101	116	F16.8	Percentage cf case I water pixels	
16		117	124	I8	Number of case II water pixels	
17		125	140	F16.8	Percentage of case II water pixels	
18		141	148	I8	Number of unprocessable water pixels (band 4 data saturation, unconvergence of iteration calculation, etc.)	
19		149	164	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	165	1188		HISTOGRAM DATA SEGMENT	
20		165	1188	25684	Histogram value of Ch.12 for water pixels (from level 0 to level 255)	
21		1189	3800		Blanks	

Radiometric Correction Parameter Record.

RAD_CAL_PAR - Identifies the Radiometric Calibration Parameters Segment in the Radiometric Correction Parameter Record.

PRE_CAL_PAR - Identifies the Prelaunch Calibration Parameters Segment in the Radiometric Correction Parameter Record.

ADJ_PAR - Identifies the Adjust Parameters Segment in the Radiometric Correction Parameter Record.

SEN_DEC_PAR - Identifies the Sensitivity Decay Parameters Segment in the Radiometric Correction Parameter Record.

ATM_COR_PAR - Identifies the Atmospheric Correction Parameters Segment in the Radiometric Correction Parameter Record.

COM_PAR - Identifies the Common Parameters Segment in the Radiometric Correction Parameter Record.

RAY_COR_PAR - Identifies the Rayleigh Correction Parameters Segment in the Radiometric Correction Parameter Record.

AER_COR_PAR - Identifies the Aerosol Correction Parameters Segment in the Radiometric Correction Parameter Record.

WAT_DESC_PAR - Identifies the Case 1 and Case 2 Water Discrimination Parameters in the Radiometric Correction Parameter Record.

ITER_CALC_PAR - Identifies the Iteration Calculation Parameters Segment in the Radiometric Correction Parameter Record.

GEO_PROC_PAR - Identifies the Geophysical Processing Parameters Record in the Radiometric Correction Parameter Record.

DAT_SCA_SEGM - Identifies the Data Scale Segment in the Data Scale and Histogram Record.

HIST_DAT_SEGM - Identifies the Histogram Data Segment in the Data Scale and Histogram Record.

PIX_PAR - Identifies the Pixel Group Parameters Segment in the File Descriptor Record of the Imagery File.

IMA_PAR - Identifies the Image Parameters Segment in the File Descriptor Record of the Imagery File.

REC_PAR - The same for the Record Parameters Segments.

LOC_FIELDS - The Prefix/Suffix Locators Fields Segment appear in the File Descriptor Record of the Imagery File.

DATA_DESC - Identifies the Pixel Data Description Segment in the File Descriptor Record.

LINN_DESC - LINN Description appear in the File Descriptor Record of the Imagery File.

PRE_DATA - Identifies the Prefix Data Segment in the

Image Record.

IMA_DATA - Identifies the Image Data Segment in the Image Record.

SUF_DATA - The same for the Suffix Data Segment.

TRA_DATA - Identifies the Trailer Data Segment in the Trailer Records.

IMAGERY_VOLUME
TRAILER_FILE
TRAILER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	90
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	16	I4	Trailer record sequence number	$$$1
8		17	20	A4	Blanks	Blanks
TRA_DATA	*	21	360		TRAILER DATA:	
9		21	28	I8	Number of HDT sync losses	
10		29	36	I8	Number of HDT parity errors	
11		37	44	I8	Number of WBVT sync losses	
12		45	52	I8	Number of WBVT bit slip occurrences	
13		53	360		Blanks	

NULL_VOLUME
VOLUME_DIRECTORY_FILE
VOLUME_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
VOL_DOC_SEGM	*	17	44		Volume Documentation Segment	
9		17	28	A12	Superstructure control document number	CCB-CCT-0002
10		29	30	A2	Superstructure control document revision number	$F
11		31	32	A2	Superstructure record format revision letter <XX> (initially '$A',then '$B',etc...)	$A
12		33	44	A12	Software release number:NICZ-002-XXX initially XXX=001,then 002,etc.	
VOL_IDE_SEGM	*	45	172		Volume Identification Segment	
13		45	60	A16	Physical Volume identification:<MNNS$YYDDDHHMM$$> M - Mission (=B for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of tape creation DDD - Day of tape creation HH - Hour of tape creation MM - Minutes of tape creation	
14		61	76	A16	Logical Volume identification:<MNNS$YYDDDHHMM00> M - Mission (=B for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of center frame acquisition DDD - Day of center frame acquisition HH - Hour of center frame acquisition MM - Minutes of center frame acquisition	Blanks
15		77	92	A16	Volume Set ID	NIMBUS7CZCS$L2
16		93	94	I2	Number of Physical Volumes in the Set	$1
17		95	96	I2	Physical Volume Number, Start of Logical Volume	$1
18		97	98	I2	Physical Volume Number, End of Logical Volume	$1
19		99	100	I2	Physical Volume sequence number (i.e. of current tape)	$1
20		101	104	I4	First Referenced File Number in this Physical Volume	$$$1
21		105	108	I4	Logical Volume Number within Volume Set	$$$1
22		109	112	I4	Logical Volume Number within Physical Volume	$$$1
23		113	120	A8	Logical Volume Creation Date <YYYYMMDD>	Blanks
24		121	128	A8	Logical Volume Creation Time <HHMMSSXX>	Blanks

25	129	140	A12	Logical Volume Generating Country	Blanks
26	141	148	A8	Logical Volume Generating Agency	Blanks
27	149	160	A12	Logical Volume Generating Facility	Blanks
28	161	164	I4	Number of Pointer Records in Volume Directory	Blanks
29	165	168	I4	Number of Records in Volume Directory	Blanks
30	169	172	I4	Number of Logical Volumes on this Physical Volume	Blanks
31	173	260	A88	Volume Descriptor Spare Segment	Blanks
32	261	360	A100	Local Use Segment	Blanks

5 ANNEXES

5.1 CEOS codes

5.1.1 Superstructure record types

The Committee on Earth Observation Satellites(CEOS) has suggested the following codes for the different record types (they are all in decimal):

	CEOS file	CEOS record	CEOS mission	CEOS origin
VOLUME DESCRIPTOR	192	192	18	18
NULL VOLUME DESCRIPTOR	192	192	63	18
FILE POINTER	219	192	18	18
FILE DESCRIPTOR	63	192	18	18
TEXT RECORD	18	63	18	18

5.1.2 Codes for CZCS

	CEOS file	CEOS record	CEOS mission	CEOS origin
QL Catalog information	40	10	22	50
QL Image record	40	20	22	50
LEAD Scene Header CZCS ESA	10	10	22	50
LEAD CRT Documentation CZCS	10	11	22	50
LEAD Image Location CZCS ESA	10	41	22	50
LEAD Orbit & Attitude CZCS	10	40	22	50
LEAD Radiometric Correction	10	60	22	50
LEAD Data Scale Histogram	10	61	22	50
IMOP LINN CZCS ESA	50	20	22	50
TRAI Trailer Record CZCS ESA	90	10	22	50

5.2 Record Fields Codes

These are the names used for the fields and group of fields in the CZCS LEVEL2 ESA format description.

REC_IDE_SEGM - Identifies the Record Identification Segment.

VOL_DOC_SEGM - Identifies the Volume Documentation Segment of the Volume Descriptor Record.

VOL_IDE_SEGM - Identifies the Volume Identification Segment of the Volume Descriptor Record.

FILE_IDE_SEGM - Identifies the File Identification Segment appearing in the File Pointer Record.

FDR_FIXED_SEGM - The File Descriptor Record Fixed Segment appear in each File Descriptor Record.

FDR_VARIA_SEGM - The same is for the File Descriptor Record Variable segment.

QL_IMA_PAR - Identifies the Quicklook Image Parameter segment of the Quicklook File Descriptor Record.

QL_REC_PAR - Identifies the Quicklook Record Parameter Segment of the Quicklook File Descriptor Record.

QL_IMA_DESC - Identifies the Quicklook Image Description Segment of the Quicklook File Descriptor Record.

QL_IMA_PXL_DESC- Identifies the Quicklook Image Pixel Description Segment of the Quicklook File Descriptor Record.

CAT_INFO_SEGM - Identifies the Catalogue Information Segment of the Catalogue Information Record.

SCE_PAR - Identifies the Scene Parameters Segment in the Scene Header Record

MIS_PAR - Identifies the Mission Parameters Segment in the Scene Header Record.

SEN_PAR - Identifies the Sensor Parameters Segment in the Scene Header Record.

FRAME_PAR - Identifies the Frame Parameters Segment in the Scene Header Record.

PRO_PAR - Identifies the Processing Parameters Segment in the Scene Header Record.

CRT_DOC_SEGM - Identifies the CRT Documentation Segment in the CRT Documentation Record.

ILT_TYPA_SEGM - Identifies the ILT TYPE A data Segment of the CRTT Documentation Record.

EPHE_DAT_SEGM - Identifies the Ephemeris Data Segment in the Orbit and Attitude Data Record.

ATTI_DAT_SEGM - Identifies the Attitude Data Segment in the Orbit and Attitude Data Record.

W/L/C DISC_PAR - Identifies the Water/Land/Cloud Discrimination Parameters Segment in the

Radiometric Correction Parameter Record.

RAD_CAL_PAR - Identifies the Radiometric Calibration Parameters Segment in the Radiometric Correction Parameter Record.

PRE_CAL_PAR - Identifies the Prelaunch Calibration Parameters Segment in the Radiometric Correction Parameter Record.

ADJ_PAR - Identifies the Adjust Parameters Segment in the Radiometric Correction Parameter Record.

SEN_DEC_PAR - Identifies the Sensitivity Decay Parameters Segment in the Radiometric Correction Parameter Record.

ATM_COR_PAR - Identifies the Atmospheric Correction Parameters Segment in the Radiometric Correction Parameter Record.

COM_PAR - Identifies the Common Parameters Segment in the Radiometric Correction Parameter Record.

RAY_COR_PAR - Identifies the Rayleigh Correction Parameters Segment in the Radiometric Correction Parameter Record.

AER_COR_PAR - Identifies the Aerosol Correction Parameters Segment in the Radiometric Correction Parameter Record.

WAT_DESC_PAR - Identifies the Case 1 and Case 2 Water Discrimination Parameters in the Radiometric Correction Parameter Record.

ITER_CALC_PAR - Identifies the Iteration Calculation Parameters Segment in the Radiometric Correction Parameter Record.

GEO_PROC_PAR - Identifies the Geophysical Processing Parameters Record in the Radiometric Correction Parameter Record.

DAT_SCA_SEGM - Identifies the Data Scale Segment in the Data Scale and Histogram Record.

HIST_DAT_SEGM - Identifies the Histogram Data Segment in the Data Scale and Histogram Record.

PIX_PAR - Identifies the Pixel Group Parameters Segment in the File Descriptor Record of the Imagery File.

IMA_PAR - Identifies the Image Parameters Segment in the File Descriptor Record of the Imagery File.

REC_PAR - The same for the Record Parameters Segments.

LOC_FIELDS - The Prefix/Suffix Locators Fields Segment appear in the File Descriptor Record of the Imagery File.

DATA_DESC - Identifies the Pixel Data Description Segment in the File Descriptor Record.

LINN_DESC - LINN Description appear in the File Descriptor Record of the Imagery File.

PRE_DATA - Identifies the Prefix Data Segment in the

IMAGERY_VOLUME
IMAGERY_FILE
IMAGE_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		Record Identification Segment	
1		1	4	B4	Record sequence number (2,...,971)	
2		5		B1	File Code (according to CEOS definition)	50
3		6		B1	Record Code (according to CEOS definition)	20
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Record length	25200
PRE_DATA	*	13	44		PREFIX DATA	
7		13	16	B4	Scan line in current logical volume = 1, ...,970	
8		17	20	B4	Channel number - n/a for LINN	
9	*	21	24		Grid contents Indicator of band 5	
					1 = present, 0 = absent	
9,1		21		B1	State Boundary Grid Indicator	0
9,2		22		B1	Coastline Grid Indicator	0
9,3		23		B1	Latitude/Longitude Grid Indicator	1
9,4		24		B1	Spare	
10	*	25	28		Pixel information contents indicator of band 5	
					1 = present, 0 = absent	
10,1		25		B1	Discrimination of Ch.4 saturation indicator	1
10,2		26		B1	Discrimination of water type 1/2 indicator	1
10,3		27		B1	Discrimination of algorithm 1/2 indicator	1
10,4		28		B1	Spare	
11	*	29	32	B4	Spare	
12		33	36	B4	Station Time (UT) at start of scanning volume in millisec. of day	
13		37	40	B4	Number of left fill pixels	0
14		41	44	B4	Number of right fill pixels	0
IMA_DATA	*	45	23660		IMAGE Data for CZCS Level 2 Bands 1-12 in LINN format	
15		45	2012	196881	CZCS Level 2 Band 1 data	
16		2013	3980	196881	CZCS Level 2 Band 2 data	
17		3981	5948	196881	CZCS Level 2 Band 3 data	
18		5949	7916	196881	CZCS Level 2 Band 4 data	
19		7917	9884	196881	CZCS Level 2 Band 5 data	
20		9885	11852	196881	CZCS Lebel 2 Band 6 data	
21		11853	13820	196881	CZCS Lebel 2 Band 7 data	
22		13821	15788	196881	CZCS Level 2 Band 8 data	
23		15789	17756	196881	CZCS Level 2 Band 9 data	
24		17757	19724	196881	CZCS Level 2 Band 10 data	
25		19725	21692	196881	CZCS Level 2 Band 11 data	
26		21693	23660	196881	CZCS Level 2 Band 12 data	
SUF_DATA	*	23661	25200		SUFFIX DATA:	
27	*	23661	23664		Scan line Quality Indicator	
27,1		23661		B1	Bit slip/Sync loss indicator (1/0 = YES/NO)	
27,2		23662		B1	Spare	
27,3		23663		B1	Spare	Blank

27,4	23664	B1	Spare	Blank
28	23665 23684	B20	Spare	
29	23685 23688	B4	Line length of one band (fixed suffix position: bytes 25-28)	1968
	*23699 23896		CZCS calibration data(raw) from the CRT	
30	23699 23720	1682	Voltage staircase counts of ch.1 from step 1 to step 16	
31	23721 23752	1682	Voltage staircase counts of ch.2	
32	23753 23784	1682	Voltage staircase counts of ch.3	
33	23785 23816	1682	Voltage staircase counts of ch.4	
34	23817 23848	1682	Voltage staircase counts of ch.5	
35	23849 23880	1682	Voltage staircase counts of ch.6	
36	23881 23882	B2	Ch.1 calibration lamp radiance count	
37	23883 23884	B2	Ch.2 calibration lamp radiance count	
38	23885 23886	B2	Ch.3 calibration lamp radiance count	
39	23887 23888	B2	Ch.4 calibration lamp radiance count	
40	23889 23890	B2	Ch.5 calibration lamp radiance count	
41	23891 23892	B2	Ch.6 blackbody calibration count	
42	23893 23894	B2	Blackbody temperature count	
43	*23895 23900		Location, angles, pressure and ozone contents Indicator for current line: 1/0 - data present/absent respectively	
43,1	23895	B1	Earth location indicator	1
43,2	23896	B1	Sun angles indicator	1
43,3	23897	B1	Satellite angle indicator	1
43,4	23898	B1	Rayleigh atmospheric thickness indicator	
43,5	23899	B1	Ozone concentration thickness indicator	
43,6	23900	B1	Spare	Blank
44	*23901 24362		Location Data for 77 CZCS anchor points in 1/10000 degrees	
	23901 23903	B3	Latitude anchor point 1	
	23904 23906	B3	Longitude anchor point 1	
			 2-76	
	24357 24359	B3	Latitude anchor point 77	
	24360 24362	B3	Longitude anchor point 77	
45	*24363 24506		Sun Angles for 77 CZCS anchor points in 1/100 degree:	
	24363 24364	B2	Zenith anchor point 1	
			 2-76	
	24515 24516	B2	Zenith anchor point 77	
46	*24517 24824		Satellite Angles for 77 CZCS anchor points in 1/100 degree:	
	24517 24518	B2	Zenith anchor point 1	
	24519 24520	B2	Sun satellite Azimuth anchor point 1	
			 2-76	
	24821 24822	B2	Zenith anchor point 77	
	24823 24824	B2	Sun satellite Azimuth anchor point 77	
47	24825 24978	77B2	Rayleigh atmosphere thickness	
48	24979 25132	77B2	Ozone concentration thickness	
49	25133 25200		Spare	Blanks

67-31	853	856	I4	Number of left fill bits within pixel	$$$0
67-32	857	860	I4	Number of right fill bits within pixel	$$$0
67-33	861	868	I8	Maximum data range of pixel values	$$$$$255
67-34	869	876	A8	Left fill pixel bit data description	$$$$$$$$
67-35	877	884	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 8	
67-36	885	888	I4	Number of left fill bits within pixel	$$$0
67-37	889	892	I4	Number of right fill bits within pixel	$$$0
67-38	893	900	I8	Maximum data range of pixel values	$$$$$255
67-39	901	908	A8	Left fill pixel bit data description	$$$$$$$$
67-40	909	916	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 9	
67-41	917	920	I4	Number of left fill bits within pixel	$$$0
67-42	921	924	I4	Number of right fill bits within pixel	$$$0
67-43	925	932	I8	Maximum data range of pixel values	$$$$$255
67-44	933	940	A8	Left fill pixel bit data description	$$$$$$$$
67-45	941	948	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 10	
67-46	949	952	I4	Number of left fill bits within pixel	$$$0
67-47	953	956	I4	Number of right fill bits within pixel	$$$0
67-48	957	964	I8	Maximum data range of pixel values	$$$$$255
67-49	965	972	A8	Left fill pixel bit data description:	$$$$$$$$
67-50	973	980	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 11	
67-51	981	984	I4	Number of left fill bits within pixel	$$$0
67-52	985	988	I4	Number of right fill bits within pixel	$$$0
67-53	989	996	I8	Maximum data range of pixel values	$$$$$255
67-54	997	1004	A8	Left fill pixel bit data description	$$$$$$$$
67-55	1005	1012	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 12	
67-56	1013	1016	I4	Number of left fill bits within pixel	$$$0
67-57	1017	1020	I4	Number of right fill bits within pixel	$$$0
67-58	1021	1028	I8	Maximum data range of pixel values	$$$$$255
67-59	1029	1036	A8	Left fill pixel bit data description	$$$$$$$$
67-60	1037	1044	A8	Right fill pixel bit data description	$$$$$$$$
68	1045	25200		Blanks	Blanks

IMAGERY_VOLUME
TRAILER_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	90
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>, (Initially '$A', then '$B',etc.)	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$4
14		49	64	A16	File Name	NI7$CZCSTRAILINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	N
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	360		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of trailer records	$$$$$1
30		187	192	I6	Trailer record length	$$$360

31		193	216	A24	Reserved (blanks)	Blanks
LOC_FIELDS	*	217	264		LOCATORS FIELDS	

```
                    Locator field structure is as follows:
!!!!!!          Byte  1- 6: Record number containing that field
......!!!!!!    Byte  7-12: Byte position of the field within record
............!!! Byte 13-15: Length of field in bytes
...............! Byte    16: Data type code of field
```

32	217	232	A16	Quality code summary map field locator	$$$$$2$$$$21$32N
33	233	264	A32	Blanks	Blanks
34	249	360		Blanks	Blanks

IMAGERY_VOLUME
IMAGERY_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	63
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	25200
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>,where XX='$A', etc.	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$3
14		49	64	A16	File Name	NI7$CZCSIMOPLINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	22680		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of image records(up to 970)	
30		187	192	I6	Image records length	$25200

31		193	216		Reserved (blanks)	Blanks
PIX_PAR	*	217	232		PIXEL GROUP PARAMETERS: - n/a for LINN -	
32		217	220	I4	Number of bits per pixel	$$$0
33		221	224	I4	Number of pixels per data group	$$$0
34		225	228	I4	Number of bytes per data group	$$$0
35		229	232	A4	Justification and order of pixels within data group	$$$$
IMA_PAR	*	233	272		IMAGE PARAMETERS	
36		233	236	I4	Number of bands of imagery in this file	$$12
37		237	244	I8	Number of lines per image (one band) in this file (up to $$$$$970)	
38		245	248	I4	Number of left border pixels	$$$0
39		249	256	I8	Number of image pixels per line	$$$$1968
40		257	260	I4	Number of right border pixels	$$$0
41		261	264	I4	Number of top border lines	$$$0
42		265	268	I4	Number of bottom border lines	$$$0
43		269	272	A4	Interleaving indicator	LI12
REC_PAR	*	273	296		RECORD PARAMETERS	
44		273	274	I2	Number of physical records per line	$1
45		275	276	I2	Number of physical records per multispectral line in this file	$1
46		277	280	I4	Number of bytes of prefix data per record	$$32
47		281	288	I8	Number of bytes of image data per record	$$$23616
48		289	292	I4	Number of bytes of suffix data per record	1540
49		293	296	I4	Prefix/suffix repeat flag	$$$$
PS_LOC_FIELDS	*	297	432		PREFIX/SUFFIX LOCATORS FIELDS	

The format for an 8 byte ASCII locator should be as follows :

Bytes 1-4 = start byte number of the field within prefix/suffix.

Bytes 5-6 = length in bytes of the field to be located.

Byte 7 = letter 'P' or 'S' indicating the location of field is prefix or suffix.

Byte 8 = type of data format

A = ASCII

B = Binary

N = Numeric ASCII

50		297	304	A8	Scan line number locator	$$$1$4PB
51		305	312	A8	Blanks	Blanks
52		313	320	A8	Time of scan line locator	$$21$4PB
53		321	328	A8	Left-fill count locator	$$25$4PB
54		329	336	A8	Right-fill count locator	$$29$4PB
55		337	340	A8	Blanks	Blanks
56		341	368	A8	Blanks	Blanks
57		369	376	A8	Scan line quality code locator	$$$1$4SB
58		377	384	A8	Calibration information locator	$$2999SB
59		385	432		Blanks	Blanks
DATA_DESC	*	433	464		PIXEL DATA DESCRIPTION: - n/a for LINN -	
60		433	436	I4	Number of left fill bits within pixel	$$$0

61		437	440	I4	Number of right fill bits within pixel	$$$0
62		441	448	I8	Maximum available data range of pixel (from zero)	$$$$$$$0
63		449	456	A8	Left fill pixel bits data description	$$$$$$$$
64		457	464	A8	Right fill pixel bits data description	$$$$$$$$
LINN_DESC	*	465	1044		LINN Description:	
65		465	468	I4	Number of bands per line for LINN interleaving	$$12
					LINN Pixel Group data Band 1:	
66-1		469	472	I4	Number of bits per pixel	$$$8
66-2		473	476	I4	Number of pixel per data group	$$$1
66-3		477	480	I4	Number of bytes per data group	$$$1
66-4		481	484	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 2:	
66-5		485	488	I4	Number of bits per pixel	$$$8
66-6		489	492	I4	Number of pixel per data group	$$$1
66-7		493	496	I4	Number of bytes per data group	$$$1
66-8		497	500	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 3:	
66-9		501	504	I4	Number of bits per pixel	$$$8
66-10		505	508	I4	Number of pixel per data group	$$$1
66-11		509	512	I4	Number of bytes per data group	$$$1
66-12		513	516	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 4:	
66-13		517	520	I4	Number of bits per pixel	$$$8
66-14		521	524	I4	Number of pixel per data group	$$$1
66-15		525	528	I4	Number of bytes per data group	$$$1
66-16		529	532	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 5:	
66-17		533	536	I4	Number of bits per pixel	$$$8
66-18		537	540	I4	Number of pixel per data group	$$$1
66-19		541	544	I4	Number of bytes per data group	$$$1
66-20		545	548	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 6:	
66-21		549	552	I4	Number of bits per pixel	$$$8
66-22		553	556	I4	Number of pixel per data group	$$$1
66-23		557	560	I4	Number of bytes per data group	$$$1
66-24		561	564	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 7:	
66-25		565	568	I4	Number of bits per pixel	$$$8
66-26		569	572	I4	Number of pixel per data group	$$$1
66-27		573	576	I4	Number of bytes per data group	$$$1
66-28		577	580	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 8:	
66-29		581	584	I4	Number of bits per pixel	$$$8
66-30		585	588	I4	Number of pixel per data group	$$$1
66-31		589	592	I4	Number of bytes per data group	$$$1
66-32		593	596	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 9:	
66-33		597	600	I4	Number of bits per pixel	$$$8
66-34		601	604	I4	Number of pixel per data group	$$$1

66-35	605	608	I4	Number of bytes per data group	$$$1
66-36	609	612	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 10:	
66-37	613	616	I4	Number of bits per pixel	$$$8
66-38	617	620	I4	Number of pixel per data group	$$$1
66-39	621	624	I4	Number of bytes per data group	$$$1
66-40	625	628	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 11:	
66-41	629	632	I4	Number of bits per pixel	$$$8
66-42	633	636	I4	Number of pixel per data group	$$$1
66-43	637	640	I4	Number of bytes per data group	$$$1
66-44	641	644	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 12:	
66-45	645	648	I4	Number of bits per pixel	$$$8
66-46	649	652	I4	Number of pixel per data group	$$$1
66-47	653	656	I4	Number of bytes per data group	$$$1
66-48	657	660	A4	Justification and order of pixels within data	RJLR
				LINN Pixel data description Band 1	
67-1	661	664	I4	Number of left fill bits within pixel	$$$0
67-2	665	668	I4	Number of right fill bits within pixel	$$$0
67-3	669	676	I8	Maximum data range of pixel values	$255
67-4	677	684	A8	Left fill pixel bit data description	$$$$$$$$
67-5	685	692	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 2	
67-6	693	696	I4	Number of left fill bits within pixel	$$$0
67-7	697	700	I4	Number of right fill bits within pixel	$$$0
67-8	701	708	I8	Maximum data range of pixel values	$$$$$255
67-9	709	716	A8	Left fill pixel bit data description	$$$$$$$$
67-10	717	724	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 3	
67-11	725	728	I4	Number of left fill bits within pixel	$$$0
67-12	729	732	I4	Number of right fill bits within pixel	$$$0
67-13	733	740	I8	Maximum data range of pixel values	$$$$$255
67-14	741	748	A8	Left fill pixel bit data description	$$$$$$$$
67-15	749	756	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 4	
67-16	757	760	I4	Number of left fill bits within pixel	$$$0
67-17	761	764	I4	Number of right fill bits within pixel	$$$0
67-18	765	772	I8	Maximum data range of pixel values	$$$$$255
67-19	773	780	A8	Left fill pixel bit data description	$$$$$$$$
67-20	781	788	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 5	
67-21	789	792	I4	Number of left fill bits within pixel	$$$0
67-22	793	796	I4	Number of right fill bits within pixel	$$$0
67-23	797	804	I8	Maximum data range of pixel values	$$$$$255
67-24	805	812	A8	Left fill pixel bit data description:	$$$$$$$$
67-25	813	820	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 6	
67-26	821	824	I4	Number of left fill bits within pixel	$$$0
67-27	825	828	I4	Number of right fill bits within pixel	$$$0
67-28	829	836	I8	Maximum data range of pixel values	$255
67-29	837	844	A8	Left fill pixel bit data description	$$$$$$$$
67-30	845	852	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 7	

CZCS LEVEL 2 PRODUCT

CCT FORMAT SPECIFICATION

REV. 1-1

Jan 10, 1992

DOCUMENT HISTORY:

DATE	VERSION	REVISED PAGE
August 6, 1990	Rev 0	First Draft. Pressure record is not defined
October 4,1990	Rev 0-1	Revised based on the discussion with JRC P.4,9,10,13,28,29,30,31,32,33,34,35,36, 37,38,39,41,47
October 23,1990	Rev 0-2	Addition of the Quicklook File,etc. P.1,3-1,4,5,6,7,7-1,7-2,7-3,7-4,7-5, 8,9,12,13,28,29,30,31,32,40,48,49
Nov.27, 1990	Rev 0-3	Correction of the errors P.10,11,12,29,30,31,32,33,34,35,36,37, 38,39,41,49
Dec.7, 1990	Rev 0-4	Rivision of the ozone and pressure record,etc.
Feb.22,1991	Rev 0-5	Revised based on JRC/ESA IF meeting
May.02,1991	Rev 0-6	Revised specifications by JRC suppression of pages 43, 44
.....		
Jan.10,1992	Rev 1-1	Definitive document revised by ESA & JRC accordingly to the software delivery "CZCS Level 2 processing & archiving"

1. Overview of the Standard Family Format

The CZCS Level-2 digital products are recorded on Computer Compatible Tapes (CCTs) in a format that is conformed to the Standard Family Format (SFF) conventions. This format has been recommended by the Landsat Technical Working Group (LTWG) and the Committee on Earth Observation Systems (CEOS). The SFF allows to read the same software data on CCTs that have been generated by different stations.

Conventionally, the individual tape is referred to as a physical volume. The logical volume refers to data files logically grouped on the tape. The SFF allows that more than one logical volume (a volume set) be stored on the same physical volume. One logical volume can also be split between different physical volumes.

The Standard Family of CCT Formats uses the "superstructure concept" in which data are organized at four distinct levels: volume, file, record, and data field. Data products are organized into two main logical volumes: Imagery and Supplemental Volumes. The Imagery Volume contains the imagery data itself and related image-synchronized information, with data only related to the scene. The Supplemental Volume is generally defined to contain station-related processing data such as annotation, ephemeris and attitude data. The Null Volume ends a logical volume.

Typical logical volume consists of the following files(Fig.1):
- a volume directory file which contains the logical and physical structure of the tape (the number of all files on the CCT: the position and content of these files; the number of records and maximum record length within each files);
- the data file(S) : the imagery files are preceded by a quicklook file & leader file and followed by a trailer file (the quicklook file contains quicklook image and catalogue information; the leader file contains scene introductory information; the trailer file contains quality flags as determined during the scene processing);
- a null volume directory file which indicates the end of the logical volume of a volume set (a collection of logical volumes; when the logical volume spans over more than one physical volume, the volume directory file for that logical volume is repeated at the start of the new tape.

The superstructure records consist of:
- a volume descriptor record which contains the information that applies to the logical volume as a whole such as information on the data source, physical volume identification, logical volume identification within the tape or tape set and specifies the number of file pointer records (hence the number of data files) and text records;
- a file pointer record for each of the files to supply the number and name of the associated data files, the maximum record length and the type and format of the data;
- text record(s) corresponding to the "comment statements" of a

computer programme to provide information in human readable form. ESA/EPO uses the text record to specify the product type and processing performed, the location, data and time of product creation, the specific scene identification and the physical tape identification. It is therefore used to confirm that the correct tape is being processed.

Each data file starts with a file descriptor record which explains the number of data in the file and contains location of significant data field: the "fixed" data segment specifies the file number, name and format and the "variable"segment the location of important data partitions in the file.

All records start with the record introductory information stored in binary(total of 12 bytes) which consists of:
- record sequence number (4 bytes)
- record type (4 bytes)
- record length (4 bytes)

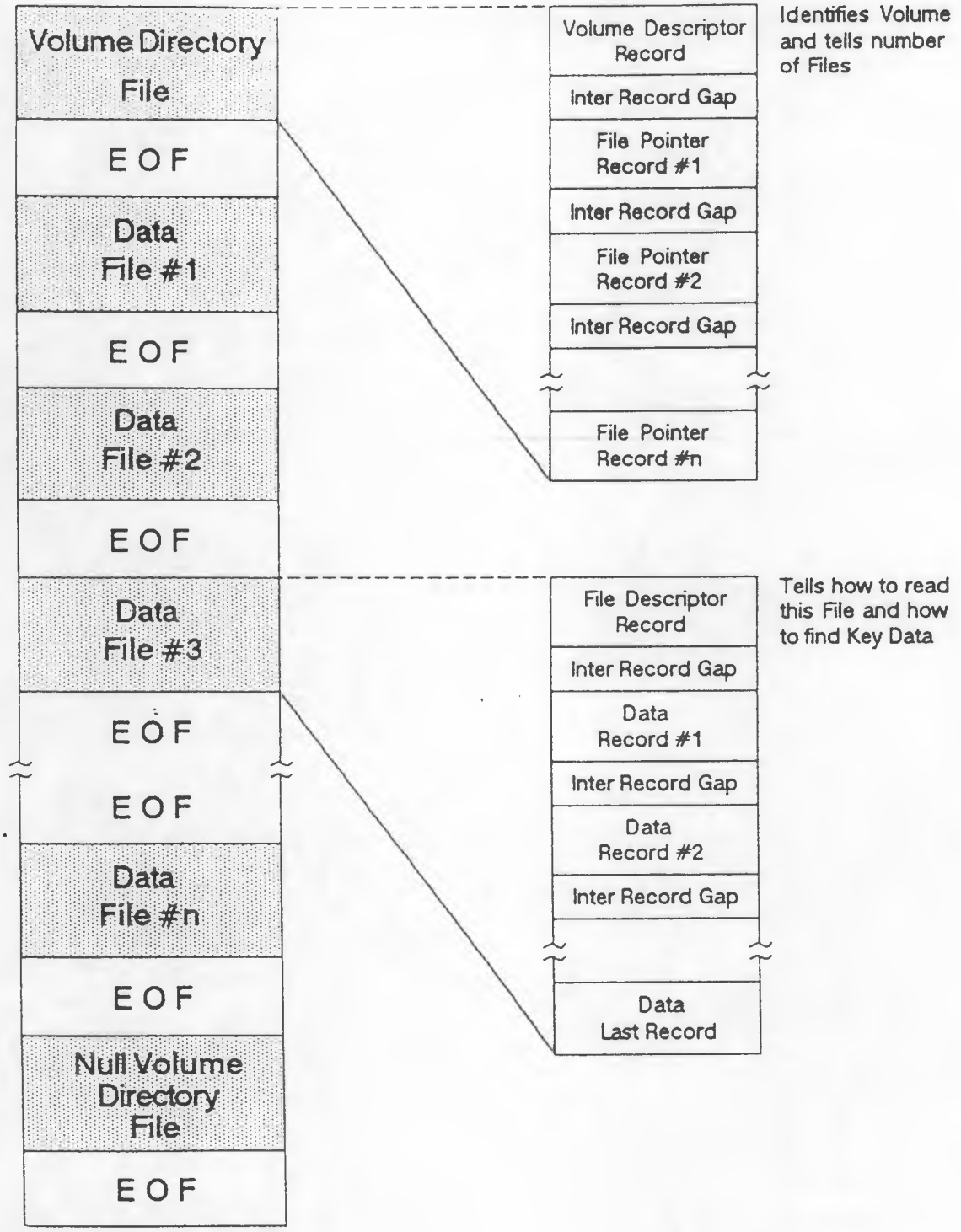


Figure 1: The Standard CCT Format – Overview

2 Overview of the CZCS Level-2 CCT format

The information contained in the ESA/EPO CZCS Level-2 CCT products is organized in one Imagery logical volume. The data organization within each logical volume is summarized below and in figure 2 and 3.

The Volume directory file has 6 records, namely the Volume descriptor and four file pointers (for the Quicklook, the Leader, the Image, and the Trailer files), plus a Text record. Each record is 360 bytes long.

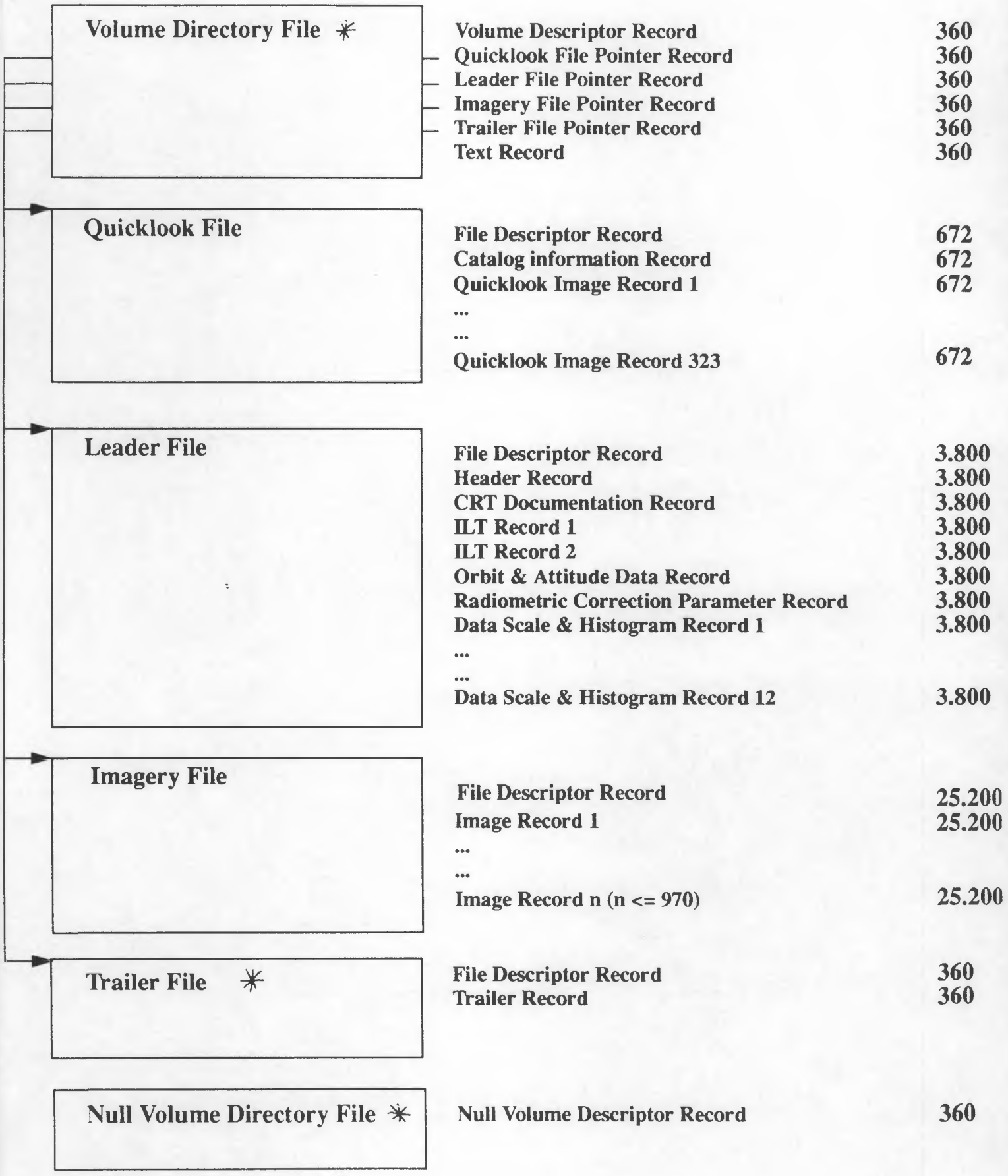
The imagery data file is preceded by a Quicklook file & a Leader file and followed by a Trailer file. The Quicklook file contains up to 325 records. A file descriptor record, a catalogue information record and up to 323 quicklook image records. Each record is 672 bytes long.

The leader file has 21 fixed records, namely the file descriptor, the scene header and 19 ancillary records. The ancillary records are CRT documentation record, 2 ILT records, orbit & attitude data record, radiometric correction parameter record, and 12 data scale & histogram records. Each record is 3800 bytes long.

The image file contains up to 971 records: a file descriptor record and up to 970 image records of 25200 bytes each. The imagery data are organized in Line INterleaved by N-bands (LINN); in this organization the data for one scan line in the 12 bands are grouped in one physical record.

The trailer file contains some quality flags as determined during the scene processing. The file contains 2 records of 360 bytes each: the file descriptor and the trailer record.

The image data for CZCS Level-2 products are calibrated, atmospheric effect corrected, and converted to the geophysical parameters. Geometric parameters are contained, but no geometric correction is applied.



* Not present in "tar" Format

3. Logical volume content description

3.1 Volume Directory File

3.1.1 Volume Descriptor Record

The volume descriptor record contains:
- the software release number
- the tape identification
- the logical volume identification
- the logical volume generating country
- the logical volume generating agency
- the logical volume generating facility
- the number of the logical volume
- the number of file pointer records
- the total number of records in the file

3.1.2 File Pointer Records

Each pointer record provides information about its referenced or associated file:
- class: Quicklook, Leader, Imagery, or Trailer
- class code: QUIC, LEAD, IMOP, or TRAI
- data type: MIXED BINARY AND ASCII or BINARY ONLY
- data type code: MBAA (mixed binary and ASCII) or BINO (binary only)
- number of records
- record length in bytes
- record length type: always FIXED LENGTH
- record length type code: always FIXD (fixed length)

3.1.3 Text Record

The text record is the last record in the volume directory file. It contains:
- the product identification
- the tape identification with the tape creation time.
- the scene identification with the time of acquisition at the scene center.

3.2 Quicklook File

3.2.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of record present in the quicklook file. The variable segment also contains quicklook look image parameter, record parameter, image description and image pixel data description.

3.2.2 Catalogue Information Record

This record contains all the information which will be recorded in the Catalogue system.

3.2.3 Quicklook Image Record

This record contains 1 line quicklook image (= 656 pixels)
The quicklook image recorded in L-2 product is the same as that of L-1 product.

3.3 Leader File

3.3.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of records present in the leader file:
- scene header record (1)
- ancillary records (always 19 fixed records)

There are no annotation records.
The locator fields supply the location and format of 8 important data fields within the leader file. Standard codes used for the locators are explained in the logical volume content description.

3.3.2 Scene Header Record

This record provides information about scene, mission, sensor, frame and processing parameters.
The scene parameters include:
- product identification ; this parameter represents the data correction status, such as calibrated or not, geophysically processed or not, location information contained or not.
- input scene identification ; this parameter represents the time (GMT) of the acquisition of the first scan line.
- location of scene center in latitude and longitude and in line and pixel in the line.
- time at the scene center (central scan line) expressed in year/ month/day/hour/minute/second/millisecond

The mission parameters contain fixed information about the mission plus a flag for ascending/descending path, and the time of ascending/descending node.

The sensor parameters contain the upper and lower limits expressed in nanometers, of the wavelengths sensed by the instrument. Gain value and tilt angle actually used for the processing of this scene are also contained.

The frame parameters contain the number of scene pixels per line and the number of scene lines.

The processing parameters indicate that CZCS Level-2 products are radiometrically calibrated, converted to geophysical parameters, but not geometrically corrected.

3.3.3 CRT Documentation Record

The content of this record is extracted from the Level-1 CRT documentation record put at the end of the CRTdata File. ILT(Image Location Tape) data are not contained.

3.3.4 ILT Record

There are 2 ILT records. The first one is extracted from the Level-1 CRT documentation record put at the top of the CRTdata File, while the second one is extracted from the Level-1 CRT documentation record put at the end of the CRTdata File.

3.3.5 Orbit & Attitude Data Record

This record provides ephemeris and attitude data during the observation period. Ephemeris data are state vector, greenwich hour angle from aries, sub satellite latitude/longitude, and altitude. Ephemeris data are given every one minute, and the maximum number of the ephemeris data set contained in this record is 3. Attitude data are given every 4 seconds, and the maximum number of the attitude data set is 31.

3.3.6 Radiometric Correction Parameter Record

This record provides the information about the radiometric correction parameters used for processing this scene.

Water/land/cloud discrimination parameters contain the threshold values to discriminate water/land/cloud pixels.

Radiometric calibration parameters contain the prelaunch calibration parameter values and the coefficients to correct the sensitivity decay of CZCS.

Atmospheric correction parameters consist of the common parameters, rayleigh correction parameters, aerosol correction parameters, case 1/case 2 water discrimination parameters and iteration calculation parameters.

Common parameters contain solar parameter values, atmospheric parameter values and water parameter values which are used for the whole Level-2 processing.

Rayleigh correction parameters contain the information of the rayleigh scattering correction method (algorithm).

Aerosol correction parameters contain the information about the equations and the coefficients values used for correction of the mie scattering effect caused by the aerosol particles.

Case 1/case 2 water discrimination parameters contain the coefficients values of the polynomial equations used for discrimination.

Iteration calculation parameters contain information about iteration calculation for correction of the aerosol particle effect. initial values, conversion criteria values and iteration limit numbers are contained.

Geophysical processing parameters contain the information about the equations and the coefficients values used for calculation of the pigment concentration, both for case 1 and case 2 water case.

3.3.7 Data Scale & Histogram Record

There are 12 data scale & histogram records for 12 bands of Level-2 image data. This record provides data scale parameters which are necessary to convert the binary values of the image to the geophysical values. Some statistical information and the histogram values of the image are also contained.

3.4 Imagery File

3.4.1 File Descriptor Record

The variable segment of this record provides the number and length of each type of record present in the imagery file.

The 8-byte data locators indicate the location and format of 6 important data fields within the imagery file. The seventh byte specifies, for each locator, if the information is stored in the prefix (P) or the suffix (S) parts of the image record.

The variable segment also describes the LINN format for "pixel group data" (one pixel) in each band: 8 bit-pixels with a right-justified format.

3.4.2 Image Record

This record is composed of three parts:
- prefix data
- image data
- suffix data

Most of the prefix and suffix data are located by the file descriptor record variable segment for the imagery file. Prefix data give the current scan line and the acquisition station time. Calibration and location information for 77 anchor points is provided in the suffix.

3.5 Trailer File

3.5.1 File Descriptor Record

One trailer file is associated with each imagery file. The file descriptor record is composed of a fixed segment which contains standard information and a variable segment the number and length of each type of records present in the leader file. The quality indicator is constructed in the same way as in the leader file.

3.5.2 Trailer Record

This record contains quality information associated with the image, such as the number of sync losses, parity errors, and bit slip occurrences.

3.6 Null Volume Directory File

This volume contains only the volume descriptor record. The structure is the same as the volume descriptor record of the imagery volume.

4. Format description

4.1 Introduction

This chapter describes in details the records within each file of the logical volume. The order of the description follows the order in which the file appears on the tape. Each record is represented as a table consisting of seven columns:

col 1 - name of the field or of the field-group (defined in Annex 2)
col 2 - field-group indicator: 'blank' if single field
'*' if field-group
col 3 - starting byte of the field (or field-group)
col 4 - last byte of the field (or field-group)
col 5 - format in which the data of this field is written (described below)
col 6 - definition and explanation of the content of the field (or field-group)
col 7 - actual content of the field if it is a constant for an ESA/EPO product.

The format described in column 5 is standard Fortran. The main formats used in this product are:

xBn = x times data written in binary form on n bytes (unformatted);
xIn = x times data written as integer values formatted on n digits (e.g., 123 written as 1I4 is: " 123");
xFn.m = x times data written as real numbers on a total of n digits including dot and sign, with m digits for the decimal part (e.g., 123.456 written as 1F10.4 is: +123.4560");
xAn = x strings of n ASCII characters.

4.2 Record table

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
VOLUME_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
VOL_DOC_SEGM	*	17	44		Volume Documentation Segment	
9		17	28	A12	Superstructure control document number	CCB-CCT-0002
10		29	30	A2	Superstructure control document revision number	$F
11		31	32	A2	Superstructure record format revision letter <XX> (initially '$A',then '$B',etc...)	$A
12		33	44	A12	Software release number:NICZ-002-XXX initially XXX = 001,then 002,etc.	
VOL_IDE_SEGM	*	45	172		Volume Identification Segment	
13		45	60	A16	Physical Volume identification: <MNNS$YYDDDHHMM$$> M - Mission (=B for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of tape creation DDD- Day of tape creation HH - Hour of tape creation MM - Minute of tape creation	
14		61	76	A16	Logical Volume ID : <MNNS$YYDDDHHMM00>	
15		77	92	A16	Volume Set ID	NIMBUS7CZCS$L2
16		93	94	I2	Number of Physical Volumes in the Set	$1
17		95	96	I2	Physical Volume Number, Start of Logical Volume	$1
18		97	98	I2	Physical Volume Number, End of Logical Volume	$1
19		99	100	I2	Physical Volume sequence number (i.e. of current tape)	$1
20		101	104	I4	First Referenced File Number in this Physical Volume	$$$1
21		105	108	I4	Logical Volume Number within Volume Set	$$$1
22		109	112	I4	Logical Volume Number within Physical Volume	$$$1
23		113	120	A8	Logical Volume Creation Date <YYYYMMDD>	
24		121	128	A8	Logical Volume Creation Time <HHMMSSXX>	
25		129	140	A12	Logical Volume Generating Country	
26		141	148	A8	Logical Volume Generating Agency	
27		149	160	A12	Logical Volume Generating Facility	
28		161	164	I4	Number of Pointer Records in Volume Directory	$$$4
29		165	168	I4	Number of Records in Volume Directory	$$$6
30		169	172	I4	Number of Logical Volumes on this Physical Volume	$$$1

31	173	260	A88	Volume Descriptor Spare Segment	Blanks
32	261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
QUICKLOOK_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$1
10		21	36	A16	Referenced File Name	NI7$CZCS$Q/LLINN
11		37	64	A28	Referenced File Class	QUICKLOOK$FILE
12		65	68	A4	Referenced File Class Code	QUIC
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$325
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$$672
17		117	124	I8	Referenced File Maximum Record Length	$$$$$672
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
LEADER_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	3
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$2
10		21	36	A16	Referenced File Name	NI7$CZCSLEADLINN
11		37	64	A28	Referenced File Class	LEADER$FILE
12		65	68	A4	Referenced File Class Code	LEAD
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$$21
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$3800
17		117	124	I8	Referenced File Maximum Record Length	$$$$3800
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
IMAGERY_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1		B4	Record Sequence Number	4
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$3
10		21	36	A16	Referenced File Name	NI7$CZCSIMOPLINN
11		37	64	A28	Referenced File Class	IMAGERY$FILE
12		65	68	A4	Referenced File Class Code	IMOP
13		69	96	A28	Referenced File Data Type	BINARY$ONLY
14		97	100	A4	Referenced File Data Type Code	BINO
15		101	108	I8	Number of Records in Referenced File (up to $$$$$971)	
16		109	116	I8	Referenced File - Descriptor Record Length	$$$25200
17		117	124	I8	Referenced File Maximum Record Length	$$$25200
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
TRAILER_FILE_POINTER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	5
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FILE_IDE_SEGM	*	17	152		File Identification Segment	
9		17	20	I4	Referenced File Number	$$$4
10		21	36	A16	Referenced File Name	NI7$CZCSTRAILINN
11		37	64	A28	Referenced File Class	TRAILER$FILE
12		65	68	A4	Referenced File Class Code	TRAI
13		69	96	A28	Referenced File Data Type	MIXED$BINARY$AND$ASCII
14		97	100	A4	Referenced File Data Type Code	MBAA
15		101	108	I8	Number of Records in Referenced File	$$$$$$$2
16		109	116	I8	Referenced File - Descriptor Record Length	$$$$$360
17		117	124	I8	Referenced File Maximum Record Length	$$$$$360
18		125	136	A12	Referenced File Record Length Type	FIXED$LENGTH
19		137	140	A4	Referenced File Record Length Type Code	FIXD
20		141	142	I2	Referenced File Physical Volume Number, Start of File	$1
21		143	144	I2	Referenced File Physical Volume Number, End of File	$1
22		145	152	I8	Referenced File Portion, 1st Record Number for this Physical Volume	$$$$$$$1
23		153	260	A108	Pointer Spare Segment	Blanks
24		261	360	A100	Local Use Segment	Blanks

IMAGERY_VOLUME
VOLUME_DIRECTORY_FILE
TEXT_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	6
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	63
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC flag for this record	A$
8		15	16	A2	Continuation flag. This field contains two blanks unless the information of this record is continued on a following record, in which case, the field is coded C$.	$$
9		17	66	A50	Product identification: PRODUCT:NIMBUSNNCZCS$LINN$GEOPHYSICAL$VALUE$$$<CrLf> (for Level 2) PRODUCT:NIMBUSNNCZCS$CRT$$$$$$$$$$$$$$$$$$$$$$$$<CrLf> (for Level 1)	
10		67	124	A58	Location, date and Time of product generation (ex.PROCESSED:$$ITALY$$$$$$$$ESA-EPOONYYYYMMDDATHHMMSS$$<CrLf>	
11		125	148	A24	Tape ID TAPEID:$MNNS$YYDDDHHMM<CrLf>, where M - Mission, e.g. B for NIMBUS NN - Mission number, e.g. 07 for NIMBUS-7 S - Sensor ID, e.g. C for CZCS YY - Year of creation DDD- Day of creation HH - Hour of creation MM - Minute of creation	
12		149	178	A30	Scene Identification SCENE$$:$MNNS$YYDDDHHMMSSmmm<CrLf>, where M - Mission, e.g. B for NIMBUS NN - Mission number,e.g. 07 for NIMBUS-7 S - Sensor ID, e.g. C for CZCS YY - Year of scene acquisition DDD - Day of scene acquisition(001,...,366) HH - Hour of scene acquisition (00,...,23) MM - Minute of scene acquisition(00,...,59) SS - Second of scene acquisition(00,...,59) mmm - Milliseconds of scene acquisition (000,...,999)	
13		179	360	A182	Blanks	

IMAGERY_VOLUME
QUICKLOOK_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	63
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>,where XX='$A', etc.	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number NICZ-002-XXX, initially XXX=001,then 02,etc.	NICZ-002-001
13		45	48	I4	File Number	$$$1
14		49	64	A16	File Name	NI7$CZCSQ/L$LINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	668		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of Catalog Information Records	$$$$$1

30		187	192	I6	Number of Q/L Image Records	$$$323
31		193	198	I6	Catalog Information Record Length	$$$672
32		199	204	I6	Q/L Image Record Length	$$$672
33		205	232		Blanks	Blanks
QL_IMA_PAR	*	233	272		Q/L IMAGE PARAMETER	
34		233	236	I4	Number of bands of imagery in the Q/L image	$$$1
35		237	244	I8	Number of lines per Q/L image (one Q/L image record contains one line of Q/L image)	$$$323
36		245	248	I4	Number of left border pixels	$$$0
37		249	256	I8	Number of Q/L image pixels per line	$$$$$656
38		257	260	I4	Number of right border pixels	$$$0
39		261	264	I4	Number of top border lines	$$$0
40		265	268	I4	Number of bottom border lines	$$$0
41		269	272	A4	Interleaving indicator -n/a	
QL_REC_PAR	*	273	296		Q/L RECORD PARAMETER	
42		273	274	I2	Number of physical records per line	$1
43		275	276	I2	Number of physical records per multispectral line in the Q/L image records -n/a	$1
44		277	280	I4	Number of bytes of prefix data per record -n/a	
45		281	288	I8	Number of bytes of image data per Q/L image record	$$$$$656
46		289	292	I4	Number of bytes of suffix data per record -n/a	
47		293	296	I4	Prefix/suffix repeat flag -n/a	
48		297	464		Blanks	Blanks
QL_IMA_DESC	*	465	484		Q/L IMAGE DESCRIPTION	
49		465	468	I4	Number of bands per line	$$$1
					Q/L Image Pixel Group Data	
50		469	472	I4	Number of bits per pixel	$$$8
51		473	476	I4	Number of pixel per data group	$$$1
52		477	480	I4	Number of bytes per data group	$$$1
53		481	484	A4	Justification and order of pixels within data group	RJLR
QL_IMA_PXL_DESC	*	485	516		Q/L Image Pixel Data Description	
54		485	488	I4	Number of left fill bits within pixel	$$$0
55		489	492	I4	Number of right fill bits within pixel	$$$0
56		493	500	I8	Maximum data range of pixel values	$$$$$$64
57		501	508	A8	Left fill pixel bit data description -n/a	$$$$$$$$
58		509	516	A8	Right fill pixel bit data description -n/a	$$$$$$$$
59		517	672		Blanks	Blanks

IMAGERY_VOLUME
QUICKLOOK_FILE
CATALOG_INFORMATION_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	40
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
CAT_INFO_SEGM	*	17			Catalog Information Segment	
9		17	32	F16.8	Equator Crossing Longitude (degree ; 0 to 360 eastward)	
10		33	40	I8	Orbit Number	
11		41	46	A6	Aquisition Date (YYMMDD)	
12		47	52	A6	Equator Crossing Time (HHMMSS)	
13		53	58	A6	Image Start Time (HHMMSS)	
14		59	64	A6	Image Stop Time (HHMMSS)	
15		65	68	A4	Quicklook OK status Y$$$ = yes, N$$$ = no	
16		69	72	I4	Product Level ($$$2 = Level 2 product)	
17		73	88	A16	Station Code A2 & Scene name A14	
18		89	104	A16	Archived Optical Disk ID for this L-2 data	
19		105	120	A16	Archived Optical Disc ID for original L-1 data	
20		121	136	F16.8	NW Corner Latitude of Q/L Image (degree)	
21		137	152	F16.8	NW Corner Longitude of Q/L Image (degree ; 0 to 360 eastward)	
22		153	168	F16.8	SW Corner Latitude of Q/L Image (degree)	
23		169	184	F16.8	SW Corner Longitude of Q/L Image	
24		185	200	F16.8	SE Corner Latitude of Q/L Image (degree)	
25		201	216	F16.8	SE Corner Longitude of Q/L Image	
26		217	232	F16.8	NE Corner Latitude of Q/L Image (degree)	
27		233	248	F16.8	NE Corner Longitude of Q/L Image (degree ; 0 to 360 eastward)	
28		249	264	F16.8	Latitude of Q/L Image Center (degree)	
29		265	280	F16.8	Longitude of Q/L Image Center (degree ; 0 to 360 eastward)	
30		281	284	I4	Data Quality Flag (*)	
31		285	288	I4	Number of Bad or Missing Lines	
32		289	304	F16.8	Percentage of Water Pixels	
33		305	320	F16.8	Percentage of satured Water Pixels	
34		321	336	F16.8	Percentage of Case I Water Pixels	
35		337	352	F16.8	Percentage of Case II Water Pixels	
36		353	368	F16.8	Percentage of Water Pixels in NW Quadrant	
37		369	384	F16.8	Percentage of Water Pixels in SW Quadrant	

38	385	400	F16.8	Percentage of Water Pixels in SE Quadrant
39	401	416	F16.8	Percentage of Water Pixels in NE Quadrant
	417	432	F16.8	Percentage of Unprocessed Water Pixels
	433	448	F16.8	Angstrom exponent
	449	464	F16.8	Percentage of Unprocessed Water Pixels
42				in SE Quadrant (filled with 0.00000000)
	465	480	F16.8	Percentage of Unprocessed Water Pixels
43				in NE Quadrant (filled with 0.00000000)
44	481	496	F16.8	Tilt Angle of the CRT(degree)
45	497	500	I4	Gain value of the CRT($$$1,$$$2,$$$3 or $$$4)
46	501	516	F16.8	Sun Azimuth of Frame Center (degree)
47	517	532	F16.8	Sun Zenith of Frame Center (degree)
48	533	536	I4	Version number of the Level-2 processing
49	537	552	A16	Rayleigh Scattering Calculation Algorithm ID
50	553	568	A16	Sensitivity Loss Correction Algorithm ID
51	569	584	A16	Reflectance Model ID for Case I Water
52	585	600	A16	Reflectance Model ID for Case II Water
53	601	616	A16	Pigment Concentration Calculation Algorithm ID for Case I Water
54	617	632	A16	Pigment Concentration Calculation Algorithm ID for Case II Water
55	633	634	A2	TOMS ozone data used/not used flag Y$ = yes, N$ = no
56	635	636	A2	ECMWF preassure level data used/not used flag Y$ = yes, N$ = no
57	637	652	F16.8	Tilt Angle used for L-2 processing(degree)
58	653	656	I4	Gain value used for L-2 processing ($$$1,$$$2,$$$3 or $$$4)
	657	660	I4	Water discrimination threshold (0 to 255)
	661	672	A12	To be used

IMAGERY_VOLUME
QUICKLOOK_FILE
QUICKLOOK_IMAGE_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	
2		5		B1	File Code (according to CEOS definition)	40
3		6		B1	Record Code (according to CEOS definition)	20
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	672
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
9		17	672	656B1	Quicklook Image Data of 1 line (= 656 pixels)	

IMAGERY_VOLUME
LEADER_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>, (Initially '$A',then '$B',etc.)	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$2
14		49	64	A16	File Name	NI7$CZCSLEADLINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	N
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks

FDR_VARIA_SEGM	*	181	1800		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of scene header records	$$$$$1
30		187	192	I6	Header record length	$$3800
31		193	198	I6	Number of ancillary records	$$$$19
					1 CRT documentation record	
					2 ILT records	
					1 orbit & attitude data record	
					1 ozone optical thickness record	
					1 molecular scattering optical thickness record	
					1 radiometric correction parameter record	
					12 data scale and histogram records	
32		199	204	I6	Ancillary record length	$$3800
33		205	210	I6	Number of annotation records	$$$$$0
34		211	216	I6	Annotation Record length	$$$$$0
LOC_FIELDS	*	217	376		LOCATOR FIELDS	
					The locator fields point to the position in	
					the file where various information can be found	
					coded in 16 bytes ASCII :	
					Bytes 1- 6 = record number containing that field	
					Bytes 7-12 = byte position of the field within	
					the record	
					Bytes 13-15 = length of field in bytes	
					Byte 16 = type of data code	
					A for alphanumeric;	
					B for binary;	
					N for numeric.	
35		217	232	A16	Scene identification field locator	$$$$$2$$$197$16A
36		233	248	A16	Blanks (not used)	Blanks
37		249	264	A16	Mission identification field locator	$$$$$2$$$309$16A
38		265	280	A16	Sensor identification field locator	$$$$$2$$$325$16A
39		281	296	A16	Scene center date-time field locator	$$$$$2$$$117$32A
40		297	312	A16	Geographic reference field locator	$$$$$2$$$213$32N
41		313	328	A16	Image processing performed field locator	$$$$$2$$1573$16A
42		329	344	A16	Image Format Indicator locator	$$$$$2$$1717$16A
43		345	360	A16	Band indicator locator	$$$$$2$$1653$64A
44		361	376	A16	Blanks	Blanks
45		377	3800	A3424	Blanks	Blanks

IMAGERY_VOLUME
LEADER_FILE
SCENE_HEADER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	Header record sequence number	$$$1
8		17	20	A4	Blanks	$$$$
SCE_PAR	*	21	308		SCENE PARAMETERS	
9		21	36	A16	Product identification	CZ$CALED$GPH$GEO
					Product identification defoned as: CALED = Calibrated GPHY = Geophysically processrd GEO = Location information contained	
10		37	52	A16	Input scene identification <SYYMMDDHHMMSSmmm> where: S=Sensor ID, i.e. C for CZCS YY - Year (1,...,99) MM - Month (1,...,12) DD - Day of Month (1,...,31) HH - Hour (0,...,23) MM - Minute (0,...,59) SS - Second (0,...,59) mmm - Millisecond (000,...,999) GMT at which the first scan was imaged	
11		53	68	F16.8	Input scene (frame) centre latitude in degrees	
12		69	84	F16.8	Input scene (frame) centre longitude in degrees	
13		85	100	A16	Line number at input scene centre	
14		101	116	A16	Pixel number at input scene centre	$$$$$$$$$$$$$988
15		117	148	A32	Input scene centre time <YYYYMMDDHHMMSSmmm>, followed by 15 blanks, where YYYY=year MM=month DD=day HH=hours (00 to 23) MM=minutes (00 to 59) SS=seconds (00 to 59) mmm=milliseconds (000 to 999)	
16		149	164	I16	Spare	
17		165	180	A16	Spare	
18		181	196	I16	Spare	
19		197	212	A16	The processed scene identifier is the same as the input scene identifier - same as field 10	

20		213	228	F16.8	Same as field 11	
21		229	244	F16.8	Same as field 12	
22		245	260	F16.8	Same as field 13	
23		261	276	F16.8	Same as field 14	
24		277	292	I16	Blanks	
25		293	308	I16	Blanks	
MIS_PAR	*	309	404		MISSION PARAMETERS	
26		309	324	A16	Mission identification	NIMBUS-7$$$$$$$$
27		325	340	A16	Sensor identification	CZCS$$$$$$$$$$$$$
28		341	356	I16	Orbit number	
29		357	372	A16	Ascending/descending flag ASCENDING$$$YYYY where YYYY - year of node	
30		373	388	F16.8	Ascending/descending node in degrees	
31		389	404	A16	Time of ascending/descending node <MMDDHHMMSSmmm> followed by 3 blanks, where MM = month DD = day HH = hour (00 to 23) MM = minutes (00 to 59) SS = seconds (00 to 59) mmm = milliseconds (000 to 999)	
SEN_PAR	*	405	1428		SENSOR PARAMETERS	
32		405	500	12I8	Upper and lower limits of wavelength range in nanometers B1 [433-453], B2 [510-530], B3 [540-560] B4 [660-680], B5 [700-800], B6 [1050-1250]	
33		501	516	I16	Number of active bands in the processed image. The total number of active bands is n. All subsequent reference to band number is by "logical band number" where each of the active bands, in ascending order, is assigned a logical band number in the range 1 to n(12).	
34		517	524	I8	CZCS gain value used for for processing this scene ($$$$$$$1,$$$$$$$2,$$$$$$$3 or $$$$$$$4)	
35		525	532	I8	The status of the CZCS threshold function for this scene ($$$$$$$1 = off, $$$$$$$2 = on)	
36		533	548	F16.8	The tilt angle used for processing this scene	
37		549	1428		Blanks	
FRAME_PAR	*	1429	1476		FRAME PARAMETERS	
38		1429	1444	I16	Number of scene pixels per line in the processed image	$$$$$$$$$$$$1968
39		1445	1460	I16	Number of scene lines in the processed image This is the actual number of scene lines in the imagery file following this Leader file.	
40		1461	1476	A16	Spare	
PRO_PAR	*	1477	2020		PROCESSING PARAMETERS	
41		1477	1488	A12	Calibration designator Calibration status is indicated by any combination of the following bytes codes NONE : none PI : raw data with pre-flight calibration data	PC$SC$$$$$$$

					information	
					PC : calibrated by pre-flight data	
					SC : calibrated by post-flight sensitivity decay data	
42		1489	1504	I16	Spare	
43		1505	1520	A16	Geophysical processing designator	RCACPC$$$$$$$$
					Geophysical processing status is indicated by any combination of the following bytes codes	
					NONE : none	
					RC : Rayleigh scattering effect corrected	
					AC : Aerosol scattering effect corrected	
					PC : Pigment concentration calculated	
44		1521	1536	A16	Geometric correction designator	NONE$$$$$$$$$$$$
					NONE - none	
					System corrections will be indicated by any combination of the following byte codes, preceded by the characters SYSTEM:	
					E - Earth rotation correction	
					P - Panoramic distortion & earth curvature correction	
					L - Line length correction	
45		1537	1552	A16	Resampling algorithm designator	NONE$$$$$$$$$$$$
					NONE - None	
					NN - Nearest Neighbour	
					CC - Cubic Convolution	
					S8 - 8-points (sin x)/x	
					DS8 - 8-points damped (sin x)/x	
					S16 - 16-points (sin x)/x	
					DS16 - 16-points damped (sin x)/x	
46		1553	1568	A16	Map projection identifier	NONE$$$$$$$$$$$$
					NONE - none	
47		1569	1584	A16	Product level indicator	LEVEL$2$$$$$$$$
48		1585	1600	I16	Number of Map Projection ancillary records	$$$$$$$$$$$$$$$0
49		1601	1616	I16	Number of GCP anc. records	$$$$$$$$$$$$$$$0
50		1617	1632	I16	Number of Orbit/Attitude anc. records	$$$$$$$$$$$$$$$3
					2 ILT records plus 1 orbit & attitude record	
51		1633	1648	I16	Number of all other records in Leader File	$$$$$$$$$$$$$$18
					Radiometric correction related records (optical thickness, radiometric correction parameter, data scale & histogram) and others (file descriptor, header, CRT documentation)	
52		1649	1712	A64	Active bands	
					One byte per band, maximum of 64 bands where the n'th byte is set to 1 if the band is active, and to 0 otherwise.	
53		1713	1728	A16	Interleaving indicator	LINN$$$$$$$$$$$$
54	*	1729	1744		Geographic ancillary information indicator (Y/N):	
54-1		1729		A1	Earth Location Data in Suffix	Y
54-2		1730		A1	Sun Angles in Suffix	Y
54-3		1731		A1	Satellite Angles in Suffix	Y
54-4		1732		A1	Latitude/Longitude grid in Pad bit #3 of Band 5	Y
54-5		1733		A1	Spare	
54-6		1734		A1	Spare	
54-7...16		1735	1744	A1	Blank	Blank

55	1745	1760	I16	Radiometric resolution designator of Band 1	$$$$$$$$$$$$$$8
56	1761	1776	I16	Radiometric resolution designator of Band 2	$$$$$$$$$$$$$$8
57	1777	1792	I16	Radiometric resolution designator of Band 3	$$$$$$$$$$$$$$8
58	1793	1808	I16	Radiometric resolution designator of Band 4	$$$$$$$$$$$$$$4
59	1809	1824	I16	Radiometric resolution designator of Band 5	$$$$$$$$$$$$$$8
60	1825	1840	I16	Radiometric resolution designator of Band 6	$$$$$$$$$$$$$$8
61	1841	1856	I16	Radiometric resolution designator of Band 7	$$$$$$$$$$$$$$8
62	1857	1872	I16	Radiometric resolution designator of Band 8	$$$$$$$$$$$$$$8
63	1873	1888	I16	Radiometric resolution designator of Band 9	$$$$$$$$$$$$$$8
64	1889	1904	I16	Radiometric resolution designator of Band 10	$$$$$$$$$$$$$$8
65	1905	1920	I16	Radiometric resolution designator of Band 11	$$$$$$$$$$$$$$8
66	1921	1936	I16	Radiometric resolution designator of Band 12	$$$$$$$$$$$$$$8
67	1937	1952	I16	Number of CRT documentation ancillary records	$$$$$$$$$$$$$$1
68	1953	1968	I16	Number of ozone optical thickness ancillary records	$$$$$$$$$$$$$$1
69	1969	1984	I16	Number of molecular scattering optical thickness ancillary records	$$$$$$$$$$$$$$1
70	1985	2000	I16	Number of radiometric correction parameter records	$$$$$$$$$$$$$$1
71	2001	2016	I16	Number of data scale & histogram records	$$$$$$$$$$$$$$12
72	2017	2020	I4	Version number of the processing of this scene	
73	2021	3800		Blanks	Blanks

IMAGERY_VOLUME
LEADER_FILE
CRT_DOCUMENTATION_RECORD

Field or Field Group Name		Start Byte	Last Byte	Format	Description and Explanation	Content
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record sequence number	3
2		5		B1	File code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	11
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	CRT Documentation Record sequence number	$$$1
8		17	20	A4	Blanks	$$$$
CRT_DOC_SEGM	*	21	1560		CRT Documentation Segment	
9		21	22		Physical Record Number (MSB 12 bits;binary integer) and Spares(LSB 4 bits; set to 0)	
10		23			File Control (MSB 2 bits) Record I.D. (LSB 6 bits;binary integer) 1 = leading documentation file 2 = trailing documentation file	
11		24		B1	Valid Data Flag 0(all bits off) = data is invalid 255(all bits on) = data is valid	
12		25	27	3B1	Target Area Code	
13		28		B1	File Number contained in the tape according to NASA tape format	
14		29	32	B4	Tape Sequence Number contained in NASA Standard Header Record	
15		33	36	B4	Film Frame Number	
16		37	38	B2	Starting Year Number For example,1978	
17		39	40	B2	Starting GMT Day Number Starts at 1 on Jan.1 and increments by 1 for each day of the year (1 to 366)	
18		41	44	B4	Starting Time in Milliseconds GMT. This number is in milliseconds of the GMT,and for the start of the CRTT data file	
19		45	48	B4	Increment in Milliseconds from the start time of the segment to the last data scan of the segment.	
20		49	50	B2	Orbit Number	
21		51	52	B2	Number of Scans	
22		53	54	B2	Geodetec Latitude Center ranging from 0 at the south pole to 18000(180 deg.*100) at the north pole (LSB weight is 0.01 deg)	
23		55	56	B2	Longitude Center from 0 at the Greenwich Meridian eastward to 36000 (360 deg.*100) (LSB weight is 0.01 deg)	
24		57	58	B2	Geodetic Latitude of Corner(left of truck,first in time), with scaling identical to field 14.	

25	59	60	B2	Longitude of Corner (left of truck,first in time), with scaling identical to field 15.
26	61	62	B2	Geodetic Latitude of Corner(right of truck,first in time), with scaling identical to field 14.
27	63	64	B2	Longitude of Corner (right of truck,first in time), with scaling identical to field 15.
28	65	66	B2	Geodetic Latitude of Corner(left of truck,last in time), with scaling identical to field 14.
29	67	68	B2	Longitude of Corner (left of truck,last in time) with scaling identical to field 15.
30	69	70	B2	Geodetic Latitude of Corner(right of truck,last in time), with scaling identical to field 14.
31	71	72	B2	Longitude of Corner (right of truck,last in time) with scaling identical to field 15.
32	73			ILT FLAGS Bit 1(MSB) 0 = at least one set of data not available 1 = all relevant data available Bit 2 1 = time corrections available Bit 3 1 = solar ephemeris available Bit 4 1 = data quality loss available Bit 5 1 = VIP data available Bit6-7 00 = spacecraft ephemeris not available 01 = spacecraft ephemeris predicteve 11 = spacecraft ephemeris definitive Bit 8 1 = rate coefficients available
33	74			Parameter Presence Code Bit 1(MSB) 1 = Ch.1 data is present 0 = Ch.1 data is absent Bit 2 1 = Ch.2 data is present 0 = Ch.2 data is absent Bit 3 1 = Ch.3 data is present 0 = Ch.3 data is absent Bit 4 1 = Ch.4 data is present 0 = Ch.4 data is absent Bit 5 1 = Ch.5 data is present 0 = Ch.5 data is absent Bit 6 1 = Ch.6 data is present 0 = Ch.6 data is absent Bit 7-8 Spare 0
34	75	76	B2	Number of Missing Scans
35	77	78	B2	Number of Scans Missing Ch.1 data
36	79	80	B2	Number of Scans Missing Ch.2 data
37	81	82	B2	Number of Scans Missing Ch.3 data
38	83	84	B2	Number of Scans Missing Cn.4 data
39	85	86	B2	Number of Scans Missing Ch.5 data
40	87	88	B2	Number of Scans Missing Ch.6.data
41	89		B1	Algorithm I.D.Number of Ch.1 Calibration
42	90		B1	Algorithm I.D.Number of Ch.2 Calibration
43	91		B1	Algorithm I.D.Number of Ch.3 Calibration
44	92		B1	Algorithm I.D.Number of Ch.4 Calibration
45	93		B1	Algorithm I.D.Number of Ch.5 Calibration
46	94		B1	Algorithm I.D.Number of Ch.6 Calibration
47	95		B1	Algorithm I.D.Number of Geographic Location

48	96		B1	Undefined	
49	97	100	B4	Decom Run Number	
50	101	104	B4	Decom Reel Number	
51	105	106	B2	Number of HDT Sync Losses occered reading 2 minutes period of the HDT tape	
52	107	108	B2	Number of HDT Parity Errors detected on the HDT tape during the 2 minutes period.	
53	109	110	B2	Number of WBVT Sync Losses detected by the pre-processor during generation of 2 minutes period of HDT tape.	
54	111	112	B2	Number of WBVT Bit Slip Occurences detected by the pre-processor during generation of 2 minutes period of HDT tape.	
55	113	176	32B2	Sub-Commutated 32 Housekeeping Data,scaled with 8 fractional bits	
56	177			Spare	0
57	178			Base Plate Temperature Flag 0(all bits off) = baseplate temperature is a normal preset value 255(all bits on) = temperature is obtained from the ILT	
58	179	180	B2	Baseplate Temperature This data has a fractional part of 7 bits.	
59	181	716		Spares	Blanks
60	717		B1	CZCS gain setting A binary integer value of 1,2,3 or 4	
61	718		B1	CZCS Threshold Function Status 1 = off, 2 = on	
62	719	720	B2	CZCS Tilt Angle Two's complement integer,with LSB weight of 1/1000 deg.	
63	721	722	B2	The year(4 digit) associated with the geographic scene center.	
64	723	724	B2	Scene Center Day of Year (1 to 366)	
65	725	728	B4	The Milliseconds of Day associated with the geographic center of the scene(0 to 86399999)	
66	729	730	B2	Solar Elevation at the Geographic Scene Center Values range from -90 to +90 deg.,represented by two's complement integer,with LSB weight of 1/100 deg.	
67	731	732	B2	Solar Azimuth at the Geographic Scene Center Values range from 0 to 360 deg. Unsigned binary integer,with LSB weight 1/100 deg.	
68	733	738	3B2	The Spacecraft Attitude(Roll,Pitch and Yaw) at the Geographic SCENE Center. Values range from -32 to +32 deg.,represented by two's complement integer,with LSB weight of 1/1000 deg.	
69	739		B1	Tick Label Flag for the Top/Bottom Edges 1 = tick labels are latitude 2 = tick labels are longitude	
70	740		B1	Tick Label Flag for the Left/Right Edges 1 = tick labels are latitude 2 = tick labels are longitude	

71	741	742	B2	Latitude of Top Left Tick Label Values range from 0 deg. at the south pole to 180 deg. at the north pole. Unsigned binary integer,with LSB weight of 1/100 deg.
72	743	744	B2	Latitude of Top Right Tick Label
73	745	746	B2	Latitude of Bottom Left Tick Label
74	747	748	B2	Latitude of Bottom Right Tick Label
75	749	750	B2	Longitude of Left Top Tick Label Values range from 0 to 360 deg.eastward. Unsigned binary integer,with LSB weight of 1/100 deg.
76	751	752	B2	Longitude of Left Bottom Tick Label
77	753	754	B2	Longitude of Right Top Tick Label)
78	755	756	B2	Longitude of Right Bottom Tick Label
79	757		B1	Top Tick Increments in degrees between successive ticks on each edge of the scene. Values may be 1,2,4 or 8 deg. Unsigned binary integers,with LSB weight of 1 deg.
80	758		B1	Bottom Tick Increments
81	759		B1	Left Tick Increments
82	760		B1	Right Tick Increments
83	761	814	27B2	Top Tick Location Arrays The location of the first tick is specified relative to the left end of the edge; the location of succeeding tick is specified relative to the position of the preceeding tick. Values are unsigned binary integers,representing numbers of pixels.
84	815	868	27B2	Bottom Tick Location Arrays
85	869	922	27B2	Left Tick Location Arrays The location of the first tick is specified relative to the top end of the edge; the location of succeeding tick is specified relative to the position of the proceeding tick. Values are unsigned binary integers, representing numbers of scan lines.
86	923	976	27B2	Right Tick Location Arrays
87	977	984	2B4	Slope and Intercept of Ch.1 for the conversion of the ch.1 data to radiometric units (mw/cm**2-ster-um) Signed and 7 bits whole part and 24 bits fractional.
88	985	992	2B4	Spope and Intercept of Ch.2
89	993	1000	2B4	Slops and Intercept of Ch.3
90	1001	1008	2B4	Slope and Intercept of Ch.4
91	1009	1016	2B4	Slope and Intercept of Ch.5
92	1017	1024	2B4	Slope and Intercept of Ch.6
93	1025	1536	256B2	Temperature Conversion Table Contains the temperature in degrees Celsius for the corresponding count of ch.6 data. This data has 8 bits whole part and 8 bits fractional part.

94	1537	1540	2B2	Image Enhancement Slope and Intercept of Ch.1 for display purpose, represented by two's complement integers. LSB weights are 1/256 for slopes and 1/16 for intercepts.	
95	1541	1544	2B2	Image Enhancement Slope and Intercept of Ch.2	
96	1545	1548	2B2	Image Enhancement Slope and Intercept of Ch.3	
97	1549	1552	2B2	Image Enhancement Slope and Intercept of Ch.4	
98	1553	1556	2B2	Image Enhancement Slope and Intercept of Ch.5	
99	1557	1560	2B2	Image Enhancement Slope and Intercept of Ch.6	
100	1561	3800		Spares	Blanks

				The angle between the inertial X-axis and the earth fixed x-axis,expressed in 10^{-6} radians.
21		51	53	B3 The X-component of the spacecraft velocity in km/second scaled by 2^{18}. The MSB will be used as the sign bit.
22		54	56	B3 The Y-component of the spacecraft velocity
23		57	59	B3 The Z-component of the spacecraft velocity
				If S/C ephemeris data is not available,each 24bits of items 17 thru 23 will be left at its initial value of 5777777777_8.
24		60	65	B6 Sun Right Ascension(Azimuth) The angle measured in the plane of the equator from vernal equinox to a plane normal to the equator containing the sun(true of date) and positive counterclockwise as seen from +Z(north pole). Expressed as two 24 bit words. The first 24 bits(X1) will be radians scaled by 221. The second 24 bit(x2) word will be radians scaled by 229. To get 29 bit precision, Y let Y = X1+x2 if X1>0 ; Y = X1-X2 if X1<0 If solar ephemeris data is not available, each 24 bits is left at its initial value=5777777777_8
25		66	71	B6 Sun Declination(Elevation) The angle between the sun and the inertial equator measureed in a plane normal to the inertial equator containing the sun and the earth center (true of date), positive above equator. Same scaling as item 107. If solar ephemeris data is not available, each 24 bits is left at its initial value = 5777777777_8
26		72	74	B3 Sub-satellite Longitude East longitude of normal from spacecraft to ellipsoid,expressed in 10^{-6} radians. Equatorial radius = 6378.144km Polar radius = 6356.759km
27		75	77	B3 Sub-satellite Geocentric Latitude
28		78	80	B3 Altitude The distance from the spacecraft to ellipsoid measured along the normal,expressed in meters.
				If S/C ephemeris is not available, each 24 bits of item 26 thru 28 is left at its initial value = 5777777777_8.
29		81	83	B3 Spacecraft Day/Twilight/Night Status 0 = Day (Spacecraft & subtract point both illuminated 1 = Twilight (Spacecraft illuminated,sabtract point in shade) 2 = Night (Spacecraft & Subtract point both in shade)
30		84	128	Repeat of item 17 to 29 for 60 GMT seconds

				after the GMT given in item 12 thru 14.	
31		128	173	Repeat of item 17 to 29 for 120 GMT seconds after the GMT given in item 12 thru 14,but only if 3 minutes of ephemeris data coincide with the 2 minutes 8 secondstime period contained in this record. Otherwise, each 24 bits will be 5777777_8.	
32		174	176	B3 GMT(MS) of Start of First VIP Major Frame This is given as increment in milliseconds from the time given in item 12-14. This number will always negative except when ILT data record starts exactly on the GMT integer minutes. It may cause the day count to change.	
33		177	179	B3 Spacecraft Time(1/12 Days) of Start of First VIP Major Frame to be added to the next 24-bit word (item 34). This may be negative and may cause the day count to change.	
34		180	182	B3 Spacecraft Time(MS) of Start of First VIP Major Frame to be added to the item 33. This provides the start time of data which follows in item 35 thru 47. If this word is negative,no VIP data was available. The MSB will be used as the sign bit.	
35		183	202	VIP Major Frame Q/C	
36		203		Spare	11111111_2
37		204	227	Sensor-Spacecraft Status	
38		228	239	THIR Housekeeping Data	
39		240	244	LIMS Housekeeping Data	
40		245		B1 CZCS Baseline Temperature The value is in raw counts	
41		246	248	Spacecraft Pitch Bit 1(MSB)-2 ; source code 00 = ACS data only 01 = ACS and DSAS data 10 = No ACS data(No VIP Data) In this case,entire 24 bits are set to 5777777_8. 11 = Pitch bias inserted Bit 3-24 ; Signed binary integer radian value multiplied by 10^6.	
42		249	251	Spacecraft Yaw	
43		252	254	Spacecraft Roll	
44		255	257	Spacecraft Pitch Rate Bit 1(MSB)-2 ; 00 = Normal Computation 01 = Not Computed because of gating 11 = Not computed because CZCS turned on or off about this time. 10 = Not computed because no ACS data was available Bit 3-24 ; Rate of change of S/C pitch. Signed binary integer radians per second multiplied by 10^6.	

IMAGERY_VOLUME
LEADER_FILE
ILT_RECORD

Field or Field Group Name		Start Byte	Last Byte	Format	Description and Explanation	Content
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record sequence number (4 to 5)	
2		5		B1	File code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	41
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	3800
7		13	16	I4	CRT Documentation Record sequence number ($$$1 to $$$2)	
8		17	20	A4	Blanks	$$$$
ILT_TYPA_SEGM	*	21			CZCS ILT Type A Record	
9		21	22		Physical Record Number(MSB 12 bits) and Spares (set to 0)	
10		23			Record I.D. Bit 1(MSB)-2 File Status Bit Bit 3-8 01 = Type A data record 02 = Data quality loss record 03 = Type A dummy record 11 = Tppe B data record(SOBV/TOMS) 13 = Type B dummy record 06 = Type D data record(SAM II) 31 = Time correction record	
11		24	26	B3	Data Orbit Number	
12		27		B1	GMT Year (last 2 digits only) corresponding to the data contained in item 17 thru 29	
13		28	29	B2	GMT Start Time of Year expressed in units of 2 hours(1/12 of a day) corresponding the data contained in item 17 thru 29	
14		30	32	B3	GMT Start Milliseconds of 1/12 day corresponding the data contained in item 17 thru 29	
15		33	35	B3	Spacecraft Time given in 1/12 days to be added to spacecraft time to get the corresponding spacecraft time for the associated data in item 17 thru 29. (MSB will be used as the sign bit)	
16		36	38	B3	Spacecraft Clock Time in milliseconds to be added to spacecraft 1/12 days above to get the corresponding time for the associated data in item 17 thru 29. (MSB will be used as the sign bit)	
17		39	41	B3	X co-ordinate of spacecraft location (in earth centered inertial co-ordinates true of date) Expressed in meters.	
18		42	44	B3	Y co-ordinate of spacecraft location	
19		45	47	B3	Z co-ordinate of spacecraft location	
20		48	50	B3	Greenwich Hour Angle from Aries	

45	258	260		Spacecraft Roll Rate
46	261	263	B3	DSAS Declination to Sun (Azimuth Angle) Tenth-of-degrees relative to the S/C axes,and ranges from -1800 to 1800 with negative values for sun directions to the left of S/C track(-Y hemisphere). The azimuth angle is zero when sun direction is aligned with S/C XZ-plane. Set to 5777777777_8 if no data is available.
47	264	266	B3	DSAS Declination to Sun (Elevation Angle) Tenth-of-degrees relative to the S/C axes,and range from -1800 to 1800 with positive values corresponding to sun directions below the S/C XY-plane(+Z hemisphere). Set to 5777777777_8 if no data is available.
48	267	581		15 additional sets of item 41 thru 47 for a total of 16 sets. Each set is for 1 spacecraft second after previous set(next second).
49	582	3416		7 additional sets of items 33 thru 48 for a total of 8 sets for 2 min.8 sec of coverage.
50	3417	3419	B3	Start Data Quality Loss Time The start time of an interval contained in this 2 min.8 sec period,where data quality loss has occurred,expressed as a GMT(milliseconds) increment from time given in item 32. The value should be multiples of 40 milliseconds.
51	3420	3422	B3	End Data Quality Loss Time The end time(milliseconds increment from time in item 32) of the data quality loss interval descrived above.
52	3423	3788		61 additional pairs of data quality loss intervals as descrived in item 50 and 51. Filled with 24 bit word 5777777777_8 if no more intervals)
53	3789	3791		Data Quality Loss IntervalCount,and Next Record Flag Bit1(MSB)-12 ; Integer value indicating number of valid bit slip intervals in this record.(binary integer) Bit13-24 ; Next Data Flag
54	3792	3794		Input Data Flags giving the information about the six sources of input data used to generate this record. Bit1(MSB)-2 ; Time Corrections 00 - No, 01 - Yes Bit 3-4 ; Solar Ephemeris 00 - No, 01 - Yes Bit 5-6 ; Data Quality Loss Information 00 - No, 01 - Yes Bit 7-8 ; UFO-ILT(VIP data & SAM II data) 00 - No, 01 - Yes Bit 9-10 ; Spacecraft Ephemeris 00 - No, 01 - Predictive, 11 - Definitive Bit 11-12 ; Rate Coefficients 00 - No, 01 = Yes

55	3795	3797	Stripper Information Flag
56	3798	3800	CHECKSUM Result of adding all previous 24 bit words together.

IMAGERY_VOLUME
LEADER_FILE
ORBIT_AND_ATTITUDE_DATA_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record sequence number	6
2		5		B1	File Code (according to CEOS definition)	10
3		6		B1	Record Code (according to CEOS definition)	40
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Record length	3800
7		13	16	I4	Orbit /Attitude ancillary record sequence number	$$$1
8		17	20	A4	Blanks	Blanks
9		21	24	I4	Number of ephemeris data sets (up to $$$3)	
10		25	28	I4	Number of attitude data sets (up to $$31)	
11	*	29	32		Flag indicating valid information of this record	
12		29		A1	$ or 1 if S/C ephemeris is available or not S/C ephemeris:S/C location,Greenwich hour angle from aries,S/C velocity sub satellite latitude and longitude,altitude	
13		30		A1	$ or 1 if solar ephemeris is available or not solar ephemeris:sun azimuth, sun elevation	
14		31		A1	$ or 1 if attitude data is available or not	
15		32		A1	$ or 1 if attitude rate data is available or not	
16		33	40	I8	Orbit number	
17		41	56	I16	Epoch year and day of year (YYYYDDD)	
EPHE DAT SEGM	*				Ephemeris Data Segment 1	
18		57	72	I16	Epoch time within day(msec)	
19		73	88	F16.8	X-position component(km)	
20		89	104	F16.8	Y-position component(km)	
21		105	120	F16.8	Z-position component(km)	
22		121	136	F16.8	X-velocity component(km/sec)	
23		137	152	F16.8	Y-velocity component(km/sec)	
24		153	168	F16.8	Z-velocity component(km/sec)	
25		169	184	F16.8	Greenwich hour angle from Aries (degrees)	
26		185	200	F16.8	Sub satellite latitude in degrees	
27		201	216	F16.8	Sub satellite longitude in degrees	
28		217	232	F16.8	Altitude(km)	
EPHE DAT SEGM	*	233	408		Ephemeris Data Segment 2	
EPHE DAT SEGM	*	409	584		Ephemeris Data Segment 3	
					Ephemeris data is given every one minutes	
ATTI DAT SEGM	*	585	680		Attitude Data Segment 1	
29		585	600	I16	Epoch time within day (msec)	
30		601	616	F16.8	Pitch (degree)	
31		617	632	F16.8	Yaw (degree)	
32		633	648	F16.8	Roll (degree)	

33		649	664	F16.8	Pitch rate (degree/sec)
34		665	680	F16.8	Roll rate (degree/sec)
ATTI DAT SEGM	*	681	3560		Attitude Data Segment 2 to 31
					Attitude data is given every 4 seconds
35		3561	3800		Blanks Blanks

IMAGERY_VOLUME
LEADER_FILE
RADIOMETRIC_CORRECTION_PARAMETER_RECORD

field or field_group name	start byte	stop byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM *	1	20		RECORD IDENTIFICATION SEGMENT	
1	1	4	B4	Record Sequence Number	9
2	5		B1	File Code (according to CEOS definition)	10
3	6		B1	Record Code (according to CEOS definition)	60
4	7		B1	Mission Code (according to CEOS definition)	22
5	8		B1	Origin Code (according to CEOS definition)	50
6	9	12	B4	Length of this record	3800
7	13	16	I4	Radiometric Correction Parameter Record sequence number	$$$1
8	17	20	A4	Blanks	$$$$
W/L/C_DISC_PAR *	21	24		WATER/LAND/CLOUD DISCRIMINATION PARAMETER	
9	21		B1	Threshold value of channel 5 for indetifying water pixels	
10	22		B1	Threshold value of channel 5 for discrimination of land and cloud	
11	23		B1	Threshold value of channel 4 water pixels saturation	
12	24		A1	Blank	
RAD_PAR *	25	756		RADIOMETRIC CALIBRATION PARAMETER	
CAL_PAR *	25	248		CALIBRATION PARAMETER	
13	25	56	A32	Parameter Identification	
14	57	88	2F16.8	Slope and intercept of ch.1 (in mw/cm^2-ster-μm)	
15	89	120	2F16.8	Slope and intercept of ch.2	
16	121	152	2F16.8	Slope and intercept of ch.3	
17	153	184	2F16.8	Slope and intercept of ch.4	
18	185	216	2F16.8	Slope and intercept of ch.5	
19	217	248	2F16.8	Slope and intercept of ch.6	
ADJ_PAR *	249	344		ADJUST PARAMETER	
20	337	340	I4	Tilt	
21	341	344	I4	Gain	
SEN_DEC_PAR *	345	756		SENSITIVITY DECAY PARAMETER	
22	345	376	A32	Sensitivity decay model type	
23	377	436	A60	Description of the function	
24	437	496	A60	Description of the variable	
25	497	528	2E16.8	Coefficient C_a, C_b of ch.1	
26	429	560	2E16.8	Coefficient C_a, C_b of ch.2	
27	461	592	2E16.8	Coefficient C_a, C_b of ch.3	
28	593	624	2E16.8	Coefficient C_a, C_b of ch.4	
29	625	756		Blanks	
ATM_COR_PAR *	757	3388		ATMOSPHERIC CORRECTION PARAMETER	
COM_PAR *	757	1128		COMMON PARAMETER	
30	757	772	F16.8	Mean extraterrestial solar irradiance of ch.1 (in mw/cm^2-ster-μm)	
31	773	788	F16.8	Mean extraterrestial solar irradiance of ch.2 (in mw/cm^2-ster-μm)	

32	789	804	F16.8	Mean extraterrestial solar irradiance of ch.3 (in mw/cm^2-ster-μm)
33	805	820	F16.8	Mean extraterrestial solar irradiance of ch.4 (in mw/cm^2-ster-μm)
34	821	836	F16.8	Eccentricity of the Earth's orbit
35	837	838	I2	Rayleigh optical thickness calculation flag $1 = ECMWF pressure data present and used for processing $2 = ECMWF pressure data present but not used for processing $3 = ECMWF pressure data not present
36	839	840	I2	Ozone optical thickness calculation flag $1 = TOMS ozone data present and used for processing $2 = TOMS ozone data present but not used for processing $3 = TOMS ozone data not present
37	841	856	F16.8	Rayleigh optical thickness of ch.1 at P=1013.3hPa
38	857	872	F16.8	Rayleigh optical thickness of ch.2 at P=1013.3hPa
39	873	888	F16.8	Rayleigh optical thickness of ch.3 at P=1013.3hPa
40	889	904	F16.8	Rayleigh optical thickness of ch.4 at P=1013.3hPa
41	905	920	F16.8	Gasabsorbtion of ch.1 (not Ozone)
42	921	936	F16.8	Gasabsorbtion of ch.2 (not Ozone)
43	937	952	F16.8	Gasabsorbtion of ch.3 (not Ozone)
44	953	968	F16.8	Gasabsorbtion of ch.4 (not Ozone)
45	969	984	F16.8	Ozone optical thickness of ch.1 at 340 matm cm
46	985	1000	F16.8	Ozone optical thickness of ch.2 at 340 matm cm
47	1001	1016	F16.8	Ozone optical thickness of ch.3 at 340 matm cm
48	1017	1032	F16.8	Ozone optical thickness of ch.4 at 340 matm cm
49	1033	1048	F16.8	Refractive index of water of ch.1
50	1049	1064	F16.8	Refractive index of water of ch.2
51	1065	1080	F16.8	Refractive index of water of ch.3
52	1081	1096	F16.8	Refractive index of water of ch.4
53	1097	1112	F16.8	Ratio of upwelling irradiance to radiance
54	1113	1128	F16.8	Fresnel coefficient of the sea surface averaged over all angles
RAY_COR_PAR *	1129	1164		RAYLEIGH CORRECTION PARAMETER
55	1129	1160	A32	Rayleigh correction type
56	1161	1162	I2	Correction method indicator $1 = single scattering correction $2 = multiple scattering correction $3 = special
57	1163	1164	A2	Blanks
REF_MOD_PAR *	1165			REFLECTANCE MODEL PARAMETER
58	1165	1196	A32	Aerosol correction algorithm type
59	1197	1260	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_1)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
60	1261	1324	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_2)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
61	1325	1388	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_3)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
62	1389	1452	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_4)$, $X = \ln (R(\lambda_1) / R(\lambda_3))$
63	1453	1516	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_1)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
64	1516	1580	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_2)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$
65	1581	1644	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where $Y = \ln R(\lambda_3)$, $X = \ln (R(\lambda_2) / R(\lambda_3))$

66	1645	1708	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ for case I water where Y = ln $R(\lambda_4)$, X = ln ($R(\lambda_2)$ / $R(\lambda_3)$)
67	1709	1724	F16.8	Threshold value of the pigment concentration (mg/m^3) for use of the ratio of $R(\lambda_2)$ to $R(\lambda_3)$ In case of no use of $R(\lambda_2)$ / $R(\lambda_3)$ equations, set to 100.0
68	1725	1784	A60	Description of the function which calculates $R(\lambda_4)$ for case II water where ratio ($R(\lambda_1)$ / $R(\lambda_3)$) is used
69	1785	1844	A60	Description of the variable for case II water where ratio ($R(\lambda_1)$ / $R(\lambda_3)$) is used
70	1845	1846	I2	Index to the band to be used to calculates $R(\lambda_4)$ for case II water where ratio ($R(\lambda_1)$ / $R(\lambda_3)$) is used
71	1847	1878	2F16.8	Two coefficients α and γ where ratio ($R(\lambda_1)$ / $R(\lambda_3)$) is used
72	1879	1938	A60	Description of the function which calculates $R(\lambda_4)$ for case II water where ratio ($R(\lambda_2)$ / $R(\lambda_3)$) is used
73	1939	1998	A60	Description of the variable for case II water where ratio ($R(\lambda_2)$ / $R(\lambda_3)$) is used
74	1999	2000	I2	Index to the band to be used to calculates $R(\lambda_4)$ for case II water where ratio ($R(\lambda_2)$ / $R(\lambda_3)$) is used
75	2001	2032	2F16.8	Two coefficients α and γ for case II water where ratio ($R(\lambda_2)$ / $R(\lambda_3)$) is used
76	2033	2048	F16.8	Threshold value of $R(\lambda_1)$ for use of ratio $R(\lambda_2)$ / $R(\lambda_3)$ In case of no use of $R(\lambda_2)$ / $R(\lambda_3)$ equations, set to 100.0
77	2049	3000		Blanks
WAT_DESC_PAR *	3001	3144		CASE I AND CASE II WATER DISCRIMINATION PARAMETER
78	3001	3064	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where Y = ln lim$R(\lambda_3)$, X = ln ($R(\lambda_1)$ / $R(\lambda_3)$)
79	3065	3128	4F16.8	4 coefficients of polynomial equation $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where Y = ln lim$R(\lambda_3)$, X = ln ($R(\lambda_2)$ / $R(\lambda_3)$)
80	3129	3144	F16.8	Threshold value of the pigment concentration (mg/m^3) for use of the ratio of $R(\lambda_2)$ to $R(\lambda_3)$ In case of no use of $R(\lambda_2)$ / $R(\lambda_3)$ equations, set to 100.0
ITER_CALC_PAR *	3145	3216		ITERATION CALCULATION PARAMETER
81	3145	3160	F16.8	Initial value of Angstrom exponent
82	3161	3176	F16.8	Initial value of $R(\lambda_4)$
83	3177	3192	F16.8	Acceptance criteria of convergence of Angstrom exponent calculation δ_v
84	3193	3196	I4	Iteration limit number of Angstrom exponent calculation
85	3197	3212	F16.8	Acceptance criteria of convergence of $R((\lambda_4)$ calculation $\delta R(\lambda_4)$
86	3213	3216	I4	Iteration limit number of $R(\lambda_4)$ calculation
GEO_PROC_PAR *	3217	3656		GEOPHYSICAL PROCESSING PARAMETER
87	3217	3248	A32	Case I water pigment concentration derivation algorithm type
88	3249	3312	4F16.8	4 coefficients of polynomial equation for derivation of pigment concentration case I water $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where Y = ln C, C: pigment concentration (mg/m^3), X = ln ($R(\lambda_1)$ / $R(\lambda_3)$)
89	3313	3376	4F16.8	4 coefficients of polynomial equation for derivation of pigment concentration case I water $Y=a_0+a_1*X+a_2*X^2+a_3*X^3$ where Y = ln C, C: pigment concentration (mg/m^3), X = ln ($R(\lambda_2)$ / $R(\lambda_3)$)
90	3377	3408	A32	Case II water pigment concentration derivation algorithm type
91	3409	3468	A60	Description of the function
92	3469	3528	A60	Description of the parameter

93	3529	3592	4F16.8	4 coefficients for derivation of pigment concentration for case II water using ration ($R(\lambda_1) / R(\lambda_3)$)
94	3593	3656	4F16.8	4 coefficients for derivation of pigment concentration for case II water using ratio ($R(\lambda_2) / R(\lambda_3)$)
95	3657	3800		Blanks

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD (1 to 4)

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number(8 to 11)	
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number ($$$1 to $$$4)	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	80		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	56	2E16.8	Slope and intercept for conversion of the data value to the rayleigh corrected reflectance	
12		57	64	I8	Number of water pixels	
13		65	80	F16.8	Percentage of water pixels	
14		81	88	I8	Number of satured water pixels	
15		89	104	F16.8	Percentage of satured water pixels	
					HISTOGRAM DATA SEGMENT	
14		105	1128	256B4	Histogram value of Ch.i (i ; 1 to 4) water pixels (from level 0 to level 255)	
15		1129	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 5

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	12
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	60		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	56	2E16.8	Slope and intercept for conversion of the data value to reflectance	
12		57	60	I4	Threshold data value to distinguish land and cloud area	
HIST_DAT_SEGM	*	61	124		HISTOGRAM DATA SEGMENT	
13		61	124	16B4	Histogram value of Ch.5 (from level 0 to level 15)	
14		125	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 6

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	13
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	536		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$3
10		23	24	A2	Blanks	
11		25	536	256B2	Temperature conversion table Contains the temperature in degree Celsius for the corresponding count of Ch.6 data. This data has 8 bits whole and 8 bits fractional part.	
HIST_DAT_SEGM	*	537	1560		HISTOGRAM DATA SEGMENT	
12		537	1560	256B4	Histogram value of Ch.6 (from level 0 to level 255)	
13		1561	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD (7 to 9)

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number(14 to 16)	
2		5		B1	File Code	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
		13	16	I4	Data scale and histogram record sequence number ($$$1 to $$$3)	
7		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	128		DATA SCALE SEGMENT	
8		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
9		23	24	A2	Blanks	
10		25	56	2E16.8	Slope and intercept for conversion of the data value to the water leaving reflectance	
11		57	64	I8	Number of case I water pixels	
12		65	80	F16.8	Percentage of case I water pixels	
13		81	88	I8	Number of case II water pixels	
14		89	104	F16.8	Percentage of case II water pixels	
15		105	112	I8	Number of unprocessable water pixels (band 4 data saturation, unconvergence of iteration calculation, etc.)	
16		113	128	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	129	1152		HISTOGRAM DATA SEGMENT	
17		129	1152	256B4	Histogram value of Ch.i (i ; 7 to 9) water pixels (from level 0 to level 255)	
18		1153	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 10

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	17
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8					($$$1 to $$$4)	
9		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21			DATA SCALE SEGMENT	
10		21	22	I2	Data scale representation flag	$1
					$1 = linear,	
					$2 = exponential	
					$3 = nonlinear(not exponential)	
11		23	24	A2	Blanks	
12		25	56	2E16.8	Slope and intercept for conversion of the data value to the erosol reflectance for case I water	
13		57	64	I8	Number of case I water pixels	
14		65	80	F16.8	Percentage of case I water pixels	
15		81	88	I8	Number of unprocessable water pixels	
16		89	104	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	185	1128		HISTOGRAM DATA SEGMENT	
17		105	1128	256B4	Histogram value of Ch.10 case I water pixels (from level 0 to level 255)	
18		1129	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 11

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	18
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	88		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$1
10		23	24	A2	Blanks	
11		25	40	2E16.8	Slope and intercept for conversion of the data value to the angstrom exponent for case I water	
12		41	48	I8	Number of case I water pixels	
13		49	64	F16.8	Percentage of case I water pixels	
14		65	72	I8	Number of unprocessable water pixels	
15		73	88	F16.8	Percentage of unprocessable pixels	
HIST_DAT_SEGM	*	89	1112		HISTOGRAM DATA SEGMENT	
16		89	1112	256B4	Histogram value of Ch.11 for case one water pixels (from level 0 to level 255)	
17		1113	3800		Blanks	

IMAGERY_VOLUME
LEADER_FILE
DATA_SCALE_AND_HISTOGRAM_RECORD 12

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		RECORD IDENTIFICATION SEGMENT	
1		1	4	B4	Record Sequence Number	19
2		5		B1	File COde	10
3		6		B1	Record Code	61
4		7		B1	Mission Code	22
5		8		B1	Origin Code	50
6		9	12	B4	Record Length	3800
7		13	16	I4	Data scale and histogram record sequence number	
8		17	20	A4	Blanks	Blanks
DAT_SCA_SEGM	*	21	164		DATA SCALE SEGMENT	
9		21	22	I2	Data scale representation flag $1 = linear, $2 = exponential $3 = nonlinear(not exponential)	$2
10		23	24	A2	Blanks	
11		25	56	2F16.8	2 coefficients of the equation 1 C = exp((DN-a1)/a2) where C : pigment concentration(mg/m3) DN : data value of band 12	
12		57	88	2F16.8	2 coefficients of the equation 2 C = exp((DN-a1)/a2) where C : pigment concentration(mg/m3) DN : data value of band 12	
13		89	92	I4	Threshold value of DN to use equation 2 (If DN is larger(smaller) than this threshold value, equation 2(1) must be used to calculate C from DN)	
14		93	100	I8	Number of case I water pixels	
15		101	116	F16.8	Percentage of case I water pixels	
16		117	124	I8	Number of case II water pixels	
17		125	140	F16.8	Percentage of case II water pixels	
18		141	148	I8	Number of unprocessable water pixels (band 4 data saturation, unconvergence of iteration calculation, etc.)	
19		149	164	F16.8	Percentage of unprocessable water pixels	
HIST_DAT_SEGM	*	165	1188		HISTOGRAM DATA SEGMENT	
20		165	1188	256B4	Histogram value of Ch.12 for water pixels (from level 0 to level 255)	
21		1189	3800		Blanks	

IMAGERY_VOLUME
IMAGERY_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	63
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	25200
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>,where XX='$A', etc.	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$3
14		49	64	A16	File Name	NI7$CZCSIMOPLINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	22680		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of image records(up to 970)	
30		187	192	I6	Image records length	$25200

31		193	216		Reserved (blanks)	Blanks
PIX_PAR	*	217	232		PIXEL GROUP PARAMETERS: - n/a for LINN -	
32		217	220	I4	Number of bits per pixel	$$$0
33		221	224	I4	Number of pixels per data group	$$$0
34		225	228	I4	Number of bytes per data group	$$$0
35		229	232	A4	Justification and order of pixels within data group	$$$$
IMA_PAR	*	233	272		IMAGE PARAMETERS	
36		233	236	I4	Number of bands of imagery in this file	$$12
37		237	244	I8	Number of lines per image (one band) in this file (up to $$$$$970)	
38		245	248	I4	Number of left border pixels	$$$0
39		249	256	I8	Number of image pixels per line	$$$$1968
40		257	260	I4	Number of right border pixels	$$$0
41		261	264	I4	Number of top border lines	$$$0
42		265	268	I4	Number of bottom border lines	$$$0
43		269	272	A4	Interleaving indicator	LI12
REC_PAR	*	273	296		RECORD PARAMETERS	
44		273	274	I2	Number of physical records per line	$1
45		275	276	I2	Number of physical records per multispectral line in this file	$1
46		277	280	I4	Number of bytes of prefix data per record	$$32
47		281	288	I8	Number of bytes of image data per record	$$$23616
48		289	292	I4	Number of bytes of suffix data per record	1540
49		293	296	I4	Prefix/suffix repeat flag	$$$$
PS_LOC_FIELDS	*	297	432		PREFIX/SUFFIX LOCATORS FIELDS The format for an 8 byte ASCII locator should be as follows : Bytes 1-4 = start byte number of the field within prefix/suffix. Bytes 5-6 = length in bytes of the field to be located. Byte 7 = letter 'P' or 'S' indicating the location of field is prefix or suffix. Byte 8 = type of data format A = ASCII B = Binary N = Numeric ASCII	
50		297	304	A8	Scan line number locator	$$$1$4PB
51		305	312	A8	Blanks	Blanks
52		313	320	A8	Time of scan line locator	$$21$4PB
53		321	328	A8	Left-fill count locator	$$25$4PB
54		329	336	A8	Right-fill count locator	$$29$4PB
55		337	340	A8	Blanks	Blanks
56		341	368	A8	Blanks	Blanks
57		369	376	A8	Scan line quality code locator	$$$1$4SB
58		377	384	A8	Calibration information locator	$$2999SB
59		385	432		Blanks	Blanks
DATA_DESC	*	433	464		PIXEL DATA DESCRIPTION: - n/a for LINN -	
60		433	436	I4	Number of left fill bits within pixel	$$$0

61		437	440	I4	Number of right fill bits within pixel	$$$0
62		441	448	I8	Maximum available data range of pixel (from zero)	$$$$$$$0
63		449	456	A8	Left fill pixel bits data description	$$$$$$$$
64		457	464	A8	Right fill pixel bits data description	$$$$$$$$
LINN_DESC	*	465	1044		LINN Description:	
65		465	468	I4	Number of bands per line for LINN interleaving	$$12
					LINN Pixel Group data Band 1:	
66-1		469	472	I4	Number of bits per pixel	$$$8
66-2		473	476	I4	Number of pixel per data group	$$$1
66-3		477	480	I4	Number of bytes per data group	$$$1
66-4		481	484	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 2:	
66-5		485	488	I4	Number of bits per pixel	$$$8
66-6		489	492	I4	Number of pixel per data group	$$$1
66-7		493	496	I4	Number of bytes per data group	$$$1
66-8		497	500	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 3:	
66-9		501	504	I4	Number of bits per pixel	$$$8
66-10		505	508	I4	Number of pixel per data group	$$$1
66-11		509	512	I4	Number of bytes per data group	$$$1
66-12		513	516	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 4:	
66-13		517	520	I4	Number of bits per pixel	$$$8
66-14		521	524	I4	Number of pixel per data group	$$$1
66-15		525	528	I4	Number of bytes per data group	$$$1
66-16		529	532	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 5:	
66-17		533	536	I4	Number of bits per pixel	$$$8
66-18		537	540	I4	Number of pixel per data group	$$$1
66-19		541	544	I4	Number of bytes per data group	$$$1
66-20		545	548	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 6:	
66-21		549	552	I4	Number of bits per pixel	$$$8
66-22		553	556	I4	Number of pixel per data group	$$$1
66-23		557	560	I4	Number of bytes per data group	$$$1
66-24		561	564	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 7:	
66-25		565	568	I4	Number of bits per pixel	$$$8
66-26		569	572	I4	Number of pixel per data group	$$$1
66-27		573	576	I4	Number of bytes per data group	$$$1
66-28		577	580	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 8:	
66-29		581	584	I4	Number of bits per pixel	$$$8
66-30		585	588	I4	Number of pixel per data group	$$$1
66-31		589	592	I4	Number of bytes per data group	$$$1
66-32		593	596	A4	Justification and order of pixels within data group	RJLR
					LINN Pixel Group data Band 9:	
66-33		597	600	I4	Number of bits per pixel	$$$8
66-34		601	604	I4	Number of pixel per data group	$$$1

66-35	605	608	I4	Number of bytes per data group	$$$1
66-36	609	612	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 10:	
66-37	613	616	I4	Number of bits per pixel	$$$8
66-38	617	620	I4	Number of pixel per data group	$$$1
66-39	621	624	I4	Number of bytes per data group	$$$1
66-40	625	628	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 11:	
66-41	629	632	I4	Number of bits per pixel	$$$8
66-42	633	636	I4	Number of pixel per data group	$$$1
66-43	637	640	I4	Number of bytes per data group	$$$1
66-44	641	644	A4	Justification and order of pixels within data group	RJLR
				LINN Pixel Group data Band 12:	
66-45	645	648	I4	Number of bits per pixel	$$$8
66-46	649	652	I4	Number of pixel per data group	$$$1
66-47	653	656	I4	Number of bytes per data group	$$$1
66-48	657	660	A4	Justification and order of pixels within data	RJLR
				LINN Pixel data description Band 1	
67-1	661	664	I4	Number of left fill bits within pixel	$$$0
67-2	665	668	I4	Number of right fill bits within pixel	$$$0
67-3	669	676	I8	Maximum data range of pixel values	$255
67-4	677	684	A8	Left fill pixel bit data description	$$$$$$$$
67-5	685	692	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 2	
67-6	693	696	I4	Number of left fill bits within pixel	$$$0
67-7	697	700	I4	Number of right fill bits within pixel	$$$0
67-8	701	708	I8	Maximum data range of pixel values	$$$$$255
67-9	709	716	A8	Left fill pixel bit data description	$$$$$$$$
67-10	717	724	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 3	
67-11	725	728	I4	Number of left fill bits within pixel	$$$0
67-12	729	732	I4	Number of right fill bits within pixel	$$$0
67-13	733	740	I8	Maximum data range of pixel values	$$$$$255
67-14	741	748	A8	Left fill pixel bit data description	$$$$$$$$
67-15	749	756	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 4	
67-16	757	760	I4	Number of left fill bits within pixel	$$$0
67-17	761	764	I4	Number of right fill bits within pixel	$$$0
67-18	765	772	I8	Maximum data range of pixel values	$$$$$255
67-19	773	780	A8	Left fill pixel bit data description	$$$$$$$$
67-20	781	788	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 5	
67-21	789	792	I4	Number of left fill bits within pixel	$$$0
67-22	793	796	I4	Number of right fill bits within pixel	$$$0
67-23	797	804	I8	Maximum data range of pixel values	$$$$$255
67-24	805	812	A8	Left fill pixel bit data description:	$$$$$$$$
67-25	813	820	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 6	
67-26	821	824	I4	Number of left fill bits within pixel	$$$0
67-27	825	828	I4	Number of right fill bits within pixel	$$$0
67-28	829	836	I8	Maximum data range of pixel values	$255
67-29	837	844	A8	Left fill pixel bit data description	$$$$$$$$
67-30	845	852	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 7	

67-31	853	856	I4	Number of left fill bits within pixel	$$$0
67-32	857	860	I4	Number of right fill bits within pixel	$$$0
67-33	861	868	I8	Maximum data range of pixel values	$$$$$255
67-34	869	876	A8	Left fill pixel bit data description	$$$$$$$$
67-35	877	884	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 8	
67-36	885	888	I4	Number of left fill bits within pixel	$$$0
67-37	889	892	I4	Number of right fill bits within pixel	$$$0
67-38	893	900	I8	Maximum data range of pixel values	$$$$$255
67-39	901	908	A8	Left fill pixel bit data description	$$$$$$$$
67-40	909	916	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 9	
67-41	917	920	I4	Number of left fill bits within pixel	$$$0
67-42	921	924	I4	Number of right fill bits within pixel	$$$0
67-43	925	932	I8	Maximum data range of pixel values	$$$$$255
67-44	933	940	A8	Left fill pixel bit data description	$$$$$$$$
67-45	941	948	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 10	
67-46	949	952	I4	Number of left fill bits within pixel	$$$0
67-47	953	956	I4	Number of right fill bits within pixel	$$$0
67-48	957	964	I8	Maximum data range of pixel values	$$$$$255
67-49	965	972	A8	Left fill pixel bit data description:	$$$$$$$$
67-50	973	980	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 11	
67-51	981	984	I4	Number of left fill bits within pixel	$$$0
67-52	985	988	I4	Number of right fill bits within pixel	$$$0
67-53	989	996	I8	Maximum data range of pixel values	$$$$$255
67-54	997	1004	A8	Left fill pixel bit data description	$$$$$$$$
67-55	1005	1012	A8	Right fill pixel bit data description	$$$$$$$$
				LINN Pixel data description Band 12	
67-56	1013	1016	I4	Number of left fill bits within pixel	$$$0
67-57	1017	1020	I4	Number of right fill bits within pixel	$$$0
67-58	1021	1028	I8	Maximum data range of pixel values	$$$$$255
67-59	1029	1036	A8	Left fill pixel bit data description	$$$$$$$$
67-60	1037	1044	A8	Right fill pixel bit data description	$$$$$$$$
68	1045	25200		Blanks	Blanks

IMAGERY_VOLUME
IMAGERY_FILE
IMAGE_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	12		Record Identification Segment	
1		1	4	B4	Record sequence number (2,...,971)	
2		5		B1	File Code (according to CEOS definition)	50
3		6		B1	Record Code (according to CEOS definition)	20
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Record length	25200
PRE_DATA	*	13	44		PREFIX DATA	
7		13	16	B4	Scan line in current logical volume = 1, ...,970	
8		17	20	B4	Channel number - n/a for LINN	
9	*	21	24		Grid contents Indicator of band 5 1 = present, 0 = absent	
9,1		21		B1	State Boundary Grid Indicator	0
9,2		22		B1	Coastline Grid Indicator	0
9,3		23		B1	Latitude/Longitude Grid Indicator	1
9,4		24		B1	Spare	
10	*	25	28		Pixel information contents indicator of band 5 1 = present, 0 = absent	
10,1		25		B1	Discrimination of Ch.4 saturation indicator	1
10,2		26		B1	Discrimination of water type 1/2 indicator	1
10,3		27		B1	Discrimination of algorithm 1/2 indicator	1
10,4		28		B1	Spare	
11	*	29	32	B4	Spare	
12		33	36	B4	Station Time (UT) at start of scanning volume in millisec. of day	
13		37	40	B4	Number of left fill pixels	0
14		41	44	B4	Number of right fill pixels	0
IMA_DATA	*	45	23660		IMAGE Data for CZCS Level 2 Bands 1-12 in LINN format	
15		45	2012	1968B1	CZCS Level 2 Band 1 data	
16		2013	3980	1968B1	CZCS Level 2 Band 2 data	
17		3981	5948	1968B1	CZCS Level 2 Band 3 data	
18		5949	7916	1968B1	CZCS Level 2 Band 4 data	
19		7917	9884	1968B1	CZCS Level 2 Band 5 data	
20		9885	11852	1968B1	CZCS Lebel 2 Band 6 data	
21		11853	13820	1968B1	CZCS Lebel 2 Band 7 data	
22		13821	15788	1968B1	CZCS Level 2 Band 8 data	
23		15789	17756	1968B1	CZCS Level 2 Band 9 data	
24		17757	19724	1968B1	CZCS Level 2 Band 10 data	
25		19725	21692	1968B1	CZCS Level 2 Band 11 data	
26		21693	23660	1968B1	CZCS Level 2 Band 12 data	
SUF_DATA	*	23661	25200		SUFFIX DATA:	
27	*	23661	23664		Scan line Quality Indicator	
27,1		23661		B1	Bit slip/Sync loss indicator (1/0 = YES/NO)	
27,2		23662		B1	Spare	
27,3		23663		B1	Spare	Blank

27,4	23664	B1	Spare	Blank
28	23665 23684	B20	Spare	
29	23685 23688	B4	Line length of one band (fixed suffix position: bytes 25-28)	1968
	*23699 23896		CZCS calibration data(raw) from the CRT	
30	23699 23720	16B2	Voltage staircase counts of ch.1 from step 1 to step 16	
31	23721 23752	16B2	Voltage staircase counts of ch.2	
32	23753 23784	16B2	Voltage staircase counts of ch.3	
33	23785 23816	16B2	Voltage staircase counts of ch.4	
34	23817 23848	16B2	Voltage staircase counts of ch.5	
35	23849 23880	16B2	Voltage staircase counts of ch.6	
36	23881 23882	B2	Ch.1 calibration lamp radiance count	
37	23883 23884	B2	Ch.2 calibration lamp radiance count	
38	23885 23886	B2	Ch.3 calibration lamp radiance count	
39	23887 23888	B2	Ch.4 calibration lamp radiance count	
40	23889 23890	B2	Ch.5 calibration lamp radiance count	
41	23891 23892	B2	Ch.6 blackbody calibration count	
42	23893 23894	B2	Blackbody temperature count	
43	*23895 23900		Location, angles, pressure and ozone contents Indicator for current line: 1/0 - data present/absent respectively	
43,1	23895	B1	Earth location indicator	1
43,2	23896	B1	Sun angles indicator	1
43,3	23897	B1	Satellite angle indicator	1
43,4	23898	B1	Rayleigh atmospheric thickness indicator	
43,5	23899	B1	Ozone concentration thickness indicator	
43,6	23900	B1	Spare	Blank
44	*23901 24362		Location Data for 77 CZCS anchor points in 1/10000 degrees	
	23901 23903	B3	Latitude anchor point 1	
	23904 23906	B3	Longitude anchor point 1	
			 2-76	
	24357 24359	B3	Latitude anchor point 77	
	24360 24362	B3	Longitude anchor point 77	
45	*24363 24506		Sun Angles for 77 CZCS anchor points in 1/100 degree:	
	24363 24364	B2	Zenith anchor point 1	
			 2-76	
	24515 24516	B2	Zenith anchor point 77	
46	*24517 24824		Satellite Angles for 77 CZCS anchor points in 1/100 degree:	
	24517 24518	B2	Zenith anchor point 1	
	24519 24520	B2	Sun satellite Azimuth anchor point 1	
			 2-76	
	24821 24822	B2	Zenith anchor point 77	
	24823 24824	B2	Sun satellite Azimuth anchor point 77	
47	24825 24978	77B2	Rayleigh atmosphere thickness	
48	24979 25132	77B2	Ozone concentration thickness	
49	25133 25200		Spare	Blanks

IMAGERY_VOLUME
TRAILER_FILE
FILE_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	90
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
FDR_FIXED_SEGM	*	17	180		FILE DESCRIPTOR RECORD FIXED SEGMENT	
9		17	28	A12	Control Document Number for this Data File Format	NICZ-002-001
10		29	30	A2	Control Document Revision Number <XX>, (Initially '$A', then '$B',etc.)	$A
11		31	32	A2	File Design Descriptor Revision Letter <XX>, (Initially '$A',then '$B',etc.)	$A
12		33	44	A12	Software Release Number	NICZ-002-001
13		45	48	I4	File Number	$$$4
14		49	64	A16	File Name	NI7$CZCSTRAILINN
15		65	68	A4	Record Sequence and Location Type Flag	FSEQ
16		69	76	I8	Sequence Number Location	$$$$$$$1
17		77	80	I4	Sequence Number Field Length	$$$4
18		81	84	A4	Record Code and Location Type Flag	FTYP
19		85	92	I8	Record Code Location	$$$$$$$5
20		93	96	I4	Record Code Field Length	$$$4
21		97	100	A4	Record Length and Location Type Flag	FLGT
22		101	108	I8	Record Length Location	$$$$$$$9
23		109	112	I4	Record Length Field Length	$$$4
24		113		A1	Flag indicating that data interpretation information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	Y
25		114		A1	Flag indicating that data interpretation information is included within the file in record(s) other than the descriptor <X> ,where X=Y OR N ,for YES or NO	N
26		115		A1	Flag indicating that data display information is included within the file descriptor record. <X> ,where X=Y OR N ,for YES or NO	N
27		116		A1	Flag indicating that data display information is included within the file in record(s) other than the file descriptor. <X> ,where X=Y OR N ,for YES or NO	N
28		117	180		Reserved Segment	Blanks
FDR_VARIA_SEGM	*	181	360		FILE DESCRIPTOR RECORD VARIABLE SEGMENT	
29		181	186	I6	Number of trailer records	$$$$$1
30		187	192	I6	Trailer record length	$$$360

31		193	216	A24	Reserved (blanks)	Blanks
LOC_FIELDS	*	217	264		LOCATORS FIELDS	

Locator field structure is as follows:

```
!!!!!!          Byte  1- 6: Record number containing that field
......!!!!!!    Byte  7-12: Byte position of the field within record
............!!! Byte 13-15: Length of field in bytes
...............! Byte    16: Data type code of field
```

32	217	232	A16	Quality code summary map field locator	$$$$$2$$$$21$32N
33	233	264	A32	Blanks	Blanks
34	249	360		Blanks	Blanks

IMAGERY_VOLUME
TRAILER_FILE
TRAILER_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	20		Record Identification Segment	
1		1	4	B4	Record Sequence Number	2
2		5		B1	File Code (according to CEOS definition)	90
3		6		B1	Record Code (according to CEOS definition)	10
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	16	I4	Trailer record sequence number	$$$1
8		17	20	A4	Blanks	Blanks
TRA_DATA	*	21	360		TRAILER DATA:	
9		21	28	I8	Number of HDT sync losses	
10		29	36	I8	Number of HDT parity errors	
11		37	44	I8	Number of WBVT sync losses	
12		45	52	I8	Number of WBVT bit slip occurrences	
13	:	53	360		Blanks	

NULL_VOLUME
VOLUME_DIRECTORY_FILE
VOLUME_DESCRIPTOR_RECORD

field or field-group name		start byte	last byte	format	DESCRIPTION AND EXPLANATION	CONTENT
REC_IDE_SEGM	*	1	16		Record Identification Segment	
1		1	4	B4	Record Sequence Number	1
2		5		B1	File Code (according to CEOS definition)	192
3		6		B1	Record Code (according to CEOS definition)	192
4		7		B1	Mission Code (according to CEOS definition)	22
5		8		B1	Origin Code (according to CEOS definition)	50
6		9	12	B4	Length of this record	360
7		13	14	A2	ASCII/EBCDIC Flag	A$
8		15	16	A2	2 Blanks	$$
VOL_DOC_SEGM	*	17	44		Volume Documentation Segment	
9		17	28	A12	Superstructure control document number	CCB-CCT-0002
10		29	30	A2	Superstructure control document revision number	$F
11		31	32	A2	Superstructure record format revision letter <XX> (initially '$A',then '$B',etc...)	$A
12		33	44	A12	Software release number:NICZ-002-XXX initially XXX=001,then 002,etc.	
VOL_IDE_SEGM	*	45	172		Volume Identification Segment	
13		45	60	A16	Physical Volume identification:<MNNS$YYDDDHHMM$$> M - Mission (=B for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of tape creation DDD - Day of tape creation HH - Hour of tape creation MM - Minutes of tape creation	
14		61	76	A16	Logical Volume identification:<MNNS$YYDDDHHMM00> M - Mission (=B for NIMBUS) NN - Mission number (=07 for NIMBUS-7) S - Sensor ID (=C for CZCS) YY - Year of center frame acquisition DDD - Day of center frame acquisition HH - Hour of center frame acquisition MM - Minutes of center frame acquisition	Blanks
15		77	92	A16	Volume Set ID	NIMBUS7CZCS$L2
16		93	94	I2	Number of Physical Volumes in the Set	$1
17		95	96	I2	Physical Volume Number, Start of Logical Volume	$1
18		97	98	I2	Physical Volume Number, End of Logical Volume	$1
19		99	100	I2	Physical Volume sequence number (i.e. of current tape)	$1
20		101	104	I4	First Referenced File Number in this Physical Volume	$$$1
21		105	108	I4	Logical Volume Number within Volume Set	$$$1
22		109	112	I4	Logical Volume Number within Physical Volume	$$$1
23		113	120	A8	Logical Volume Creation Date <YYYYMMDD>	Blanks
24		121	128	A8	Logical Volume Creation Time <HHMMSSXX>	Blanks

25	129	140	A12	Logical Volume Generating Country	Blanks
26	141	148	A8	Logical Volume Generating Agency	Blanks
27	149	160	A12	Logical Volume Generating Facility	Blanks
28	161	164	I4	Number of Pointer Records in Volume Directory	Blanks
29	165	168	I4	Number of Records in Volume Directory	Blanks
30	169	172	I4	Number of Logical Volumes on this Physical Volume	Blanks
31	173	260	A88	Volume Descriptor Spare Segment	Blanks
32	261	360	A100	Local Use Segment	Blanks

5 ANNEXES

5.1 CEOS codes

5.1.1 Superstructure record types

The Committee on Earth Observation Satellites(CEOS) has suggested the following codes for the different record types (they are all in decimal):

	CEOS file	CEOS record	CEOS mission	CEOS origin
VOLUME DESCRIPTOR	192	192	18	18
NULL VOLUME DESCRIPTOR	192	192	63	18
FILE POINTER	219	192	18	18
FILE DESCRIPTOR	63	192	18	18
TEXT RECORD	18	63	18	18

5.1.2 Codes for CZCS

	CEOS file	CEOS record	CEOS mission	CEOS origin
QL Catalog information	40	10	22	50
QL Image record	40	20	22	50
LEAD Scene Header CZCS ESA	10	10	22	50
LEAD CRT Documentation CZCS	10	11	22	50
LEAD Image Location CZCS ESA	10	41	22	50
LEAD Orbit & Attitude CZCS	10	40	22	50
LEAD Radiometric Correction	10	60	22	50
LEAD Data Scale Histogram	10	61	22	50
IMOP LINN CZCS ESA	50	20	22	50
TRAI Trailer Record CZCS ESA	90	10	22	50

5.2 Record Fields Codes

These are the names used for the fields and group of fields in the CZCS LEVEL2 ESA format description.

REC_IDE_SEGM - Identifies the Record Identification Segment.

VOL_DOC_SEGM - Identifies the Volume Documentation Segment of the Volume Descriptor Record.

VOL_IDE_SEGM - Identifies the Volume Identification Segment of the Volume Descriptor Record.

FILE_IDE_SEGM - Identifies the File Identification Segment appearing in the File Pointer Record.

FDR_FIXED_SEGM - The File Descriptor Record Fixed Segment appear in each File Descriptor Record.

FDR_VARIA_SEGM - The same is for the File Descriptor Record Variable segment.

QL_IMA_PAR - Identifies the Quicklook Image Parameter segment of the Quicklook File Descriptor Record.

QL_REC_PAR - Identifies the Quicklook Record Parameter Segment of the Quicklook File Descriptor Record.

QL_IMA_DESC - Identifies the Quicklook Image Description Segment of the Quicklook File Descriptor Record.

QL_IMA_PXL_DESC- Identifies the Quicklook Image Pixel Description Segment of the Quicklook File Descriptor Record.

CAT_INFO_SEGM - Identifies the Catalogue Information Segment of the Catalogue Information Record.

SCE_PAR - Identifies the Scene Parameters Segment in the Scene Header Record

MIS_PAR - Identifies the Mission Parameters Segment in the Scene Header Record.

SEN_PAR - Identifies the Sensor Parameters Segment in the Scene Header Record.

FRAME_PAR - Identifies the Frame Parameters Segment in the Scene Header Record.

PRO_PAR - Identifies the Processing Parameters Segment in the Scene Header Record.

CRT_DOC_SEGM - Identifies the CRT Documentation Segment in the CRT Documentation Record.

ILT_TYPA_SEGM - Identifies the ILT TYPE A data Segment of the CRTT Documentation Record.

EPHE_DAT_SEGM - Identifies the Ephemeris Data Segment in the Orbit and Attitude Data Record.

ATTI_DAT_SEGM - Identifies the Attitude Data Segment in the Orbit and Attitude Data Record.

W/L/C DISC_PAR - Identifies the Water/Land/Cloud Discrimination Parameters Segment in the

Radiometric Correction Parameter Record.

RAD_CAL_PAR - Identifies the Radiometric Calibration Parameters Segment in the Radiometric Correction Parameter Record.

PRE_CAL_PAR - Identifies the Prelaunch Calibration Parameters Segment in the Radiometric Correction Parameter Record.

ADJ_PAR - Identifies the Adjust Parameters Segment in the Radiometric Correction Parameter Record.

SEN_DEC_PAR - Identifies the Sensitivity Decay Parameters Segment in the Radiometric Correction Parameter Record.

ATM_COR_PAR - Identifies the Atmospheric Correction Parameters Segment in the Radiometric Correction Parameter Record.

COM_PAR - Identifies the Common Parameters Segment in the Radiometric Correction Parameter Record.

RAY_COR_PAR - Identifies the Rayleigh Correction Parameters Segment in the Radiometric Correction Parameter Record.

AER_COR_PAR - Identifies the Aerosol Correction Parameters Segment in the Radiometric Correction Parameter Record.

WAT_DESC_PAR - Identifies the Case 1 and Case 2 Water Discrimination Parameters in the Radiometric Correction Parameter Record.

ITER_CALC_PAR - Identifies the Iteration Calculation Parameters Segment in the Radiometric Correction Parameter Record.

GEO_PROC_PAR - Identifies the Geophysical Processing Parameters Record in the Radiometric Correction Parameter Record.

DAT_SCA_SEGM - Identifies the Data Scale Segment in the Data Scale and Histogram Record.

HIST_DAT_SEGM - Identifies the Histogram Data Segment in the Data Scale and Histogram Record.

PIX_PAR - Identifies the Pixel Group Parameters Segment in the File Descriptor Record of the Imagery File.

IMA_PAR - Identifies the Image Parameters Segment in the File Descriptor Record of the Imagery File.

REC_PAR - The same for the Record Parameters Segments.

LOC_FIELDS - The Prefix/Suffix Locators Fields Segment appear in the File Descriptor Record of the Imagery File.

DATA_DESC - Identifies the Pixel Data Description Segment in the File Descriptor Record.

LINN_DESC - LINN Description appear in the File Descriptor Record of the Imagery File.

PRE_DATA - Identifies the Prefix Data Segment in the

Image Record.

IMA_DATA - Identifies the Image Data Segment in the Image Record.

SUF_DATA - The same for the Suffix Data Segment.

TRA_DATA - Identifies the Trailer Data Segment in the Trailer Records.