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VERY LARGE TELESCOPE

INTERFEROMETER

VLTI Data Interface Control Document

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0.7	2 April 2002	All	Data model
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1 INTRODUCTION

1.1 SCOPE

This document defines the ESO format for interferometry data. The ESO official data interface specification [1] applies to all data structures produced or used by the ESO VLT and VLTI telescopes and instruments. This document enhances the ESO Data Interface Control Document [1]. It is applicable to all data produced by the VLTI and its instruments.The description includes raw and partially reduced optical/IR interferometer data for direct detection interferometers with spectrally dispersive elements. This format is adapted from a proposal by W.Jaffe and B.Cotton [4] and from the data exchange standard proposed by the IAU Working Group on Optical/IR Interferometry [6]. This document is meant as a technical reference and therefore its main audience is engineers or scientists who develop software to either produce, analyse or manipulate data products that conform to this specification. In particular this document is applicable to the VLTI instrument projects MIDI and AMBER.

1.2 APPLICABLE DOCUMENTS

[1] Data Interface Control Document, GEN-SPE-ESO-19400-794/2.0, May 21, 2002

[2] Interface Control Document between VLTI Supervisor Software and VLTI Instrumentation Software, VLT-ICD-ESO-15410-2117,/1.1, Dec. 21, 2001.

[3] Definition of the Flexible Image Transport System (FITS), NOST 100-2.0, Astronomy and Astrophysics, v.376, p.359-380 (2001).
The document can be found at: http://heasarc.gsfc.nasa.gov/docs/heasarc/fits.html. The FITS archive can be found at http://fits.nrao.edu

1.3 REFERENCES

[4] Jaffe, W. and Cotton, W. FITS File Formats for VLTI Interferometry Data. Draft version: 1.2.4 Nov. 16, 2000

[5] Object Names for VLTI Observations, VLT-TRE-ESO-15000-2746/1.0, February 11, 2002

[6] A Data Exchange Standard for Optical/IR Interferometry, NPOI/COAST, 15 March 2002, http://olbin.jpl.nasa.gov/iau

1.4 ABBREVIATIONS

AMBER	Astronomical Multi-BEam Recombiner
AO	Adaptive Optics
ASTO	Archive Storage System
AT	Auxiliary Telescope (1.8m)
DFS	Data Flow System
DHS	Data Handling System
DICB	Data Interface Control Board
DID	Data Interface Dictionary
DAS	Data Analysis Software
DRS	Data Reduction Software
ETC	Exposure Time Calculator
FITS	Flexible Image Transport System
FSU	Fringe Sensor Unit
HDU	Header Data Unit of a FITS file
ICD	Interface Control Document
ISS	VLTI Supervisor Software
MIDI	Mid-Infrared interferometric instrument
OB	Observation Block
OPC	Observing Program Committee
OS	Observation Software
P2PP	Phase 2 Proposal Preparation
PRIMA	Phase-Referenced Imaging and Microarcsecond Astrometry
QC	Quality Control
QC1	Quality Control Level 1
UT	Unit Telescope of VLT
UTC	Coordinated Universal Time
VINCI	VLT INterferometer Commissioning Instrument
VLT	Very Large Telescope
VLTI	Very Large Telescope Interferometer

2 OVERVIEW

The purpose of this document is to provide a reference source for the specification of the FITS files that shall be used and produced by the VLTI software. For every table this document provides the necessary FITS keywords for reading the table and the column structure of the table.

2.1 FITS FILE FORMAT AND PRIMARY HEADER

The FITS standard allow a main data segment (i.e. image) as well as other extensions to exist in a FITS file. The main header contains keywords globally describing the data contained in the file. In the VLT/VLTI FITS files the ESO hierarchical keywords described in [2] are collected from all subsystems.

Each of the table extensions has its own header similar to the main file header but which describes the structure and the content of a "table". These tables are nominally two-dimensional structures where each row in the table has an identical structure. Each column in the table can contain zero or more entries of a given data type. These intrinsically one-dimensional entries can be organised into multidimensional arrays through the use of keywords in the table header according to the FITS multi-dimension convention. An example of this usage is the storage of rectangular arrays of pixel values from the detector. Variable length entries are defined for the binary tables but are not used in this application.

Multiple table extensions may be used in a single file; these may either be multiple tables of the same type or different types. The type of the table is defined by the EXTNAME keyword in the table header. The definition of binary tables allows the structure to differ between successive tables of the same type in a given file. However in the raw VLTI Interferometry format this is not allowed. Tables in different FITS files may have different geometries.

The FITS format, header syntax and standard keywords are described in [3]. In addition to the FITS standard keywords, ESO uses a set of primary keywords in its data product headers [1]. The primary header includes most of the FITS keywords describing the file. It is organised in accordance with [1]. Examples of FITS keywords for VLT instruments and for VINCI can be found in the keywords database in [2]. The primary header of the VLTI FITS files is controlled by DICB dictionaries. An example of the VINCI primary header is provided in Section 5.1.

2.2 VLT INTERFEROMETRY TABLES

This document provides guidelines for the structure of interferometry tables. The first group of tables, called Main Interferometry Tables includes the ARRAY_DESCRIPTION, ARRAY_GEOMETRY, OPTICAL_TRAIN, IMAGING_DETECTOR, IMAGING_DATA tables. These tables are supported by the current version of the VLTI Supervisor Software (ISS, [2]) and instrument software. The keywords for these extensions are defined in the ISS and DET dictionaries respectively.

The VLTI Interferometry tables are cross-referenced (Fig. 1). The ARRAY_DESCRIPTION table provides the description and bibliographical references to the indexes used in the ARRAY_GEOMETRY and OPTICAL_TRAIN tables. The INS_DESCRIPTION table provides the description and bibliographical references to the indexes used in the INS_TRAIN table. The ARRAY_GEOMETRY table describes the geographical information about the interferometer array. The OPTICAL_TRAIN table describes the configuration of the VLTI optical elements up to the instrument entrance window. The INS_TRAIN table describes the configuration of the instrument optical elements. The IMAGING_DETECTOR describes the detector settings and he IMAGING_DATA table contains the detector data.

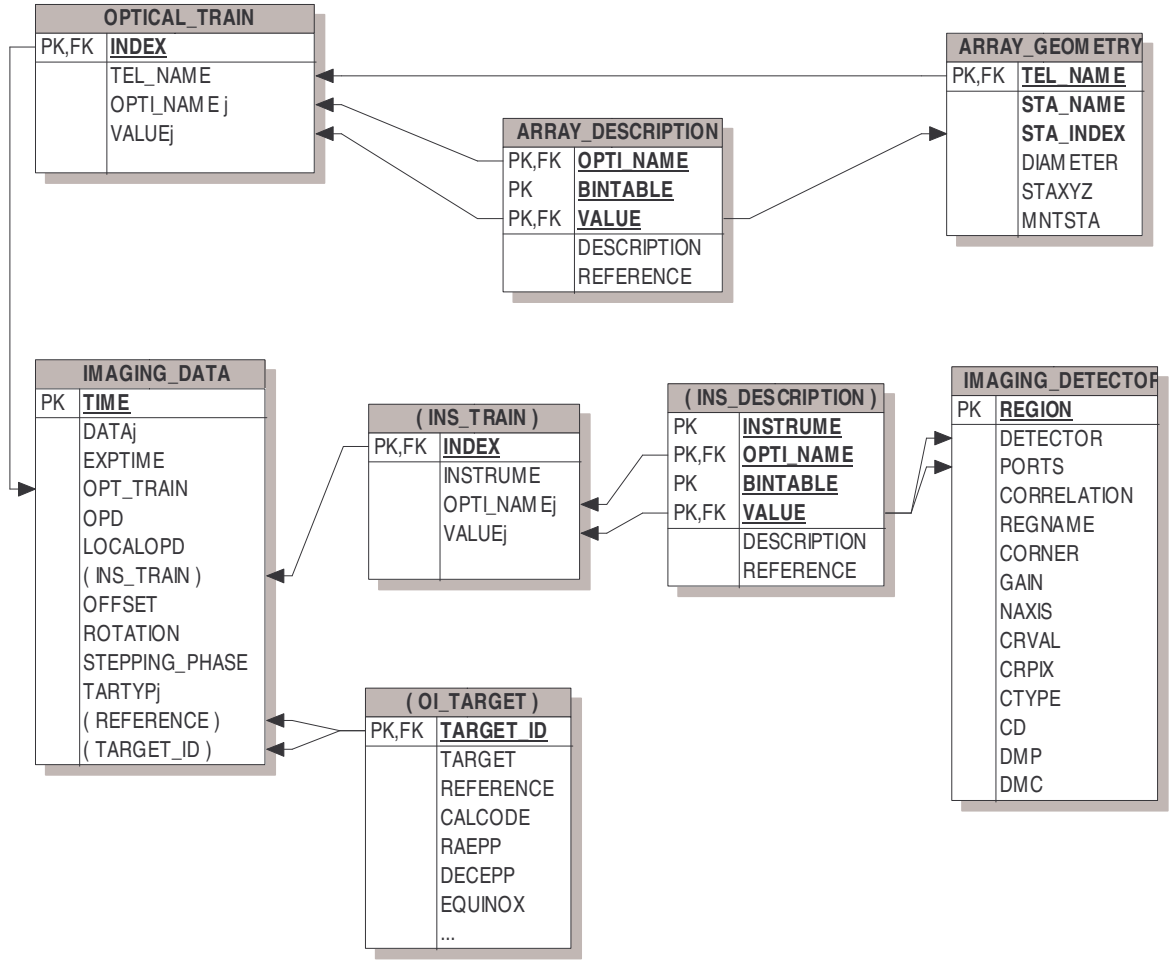

Figure 1: Data Model of the VLT Interferometry Tables. Parentheses indicate optional tables and columns.

2.3 ADDITIONAL TABLES

A second group of tables, including SCAN_DATA, OI_TARGET, OI_WAVELENGTH, OI_VIS includes tables which implementation is optional. SCAN_DATA is used for the VINCI data. The MIDI consortium is planning to use OI_TARGET, OI_WAVELENGTH, OI_VIS. Other tables such as DELAY, TIP_TILT, PHASE_REFERENCE, METROLOGY or ADAPTIVE_OPTICS have not been included in this version of the document and shall be defined as more subsystems are added to the VLTI.

2.4 IAU DATA EXCHANGE STANDARD FOR OPTICAL/IR INTERFEROMETRY

The IAU Working Group on Optical/IR Interferometry is preparing a data exchange standard for optical/IR interferometry data [6]. This is a proposed standard for exchanging *calibrated* data. It will be relevant in

particular for the data products of the VLTI pipelines. In the present document the ARRAY_GEOMETRY table conforms to the structure of the OI_ARRAY table defined in the IAU Working Group proposal. It will therefore be possible for the VLTI pipelines to copy this information to the calibrated data products. Five other tables defined by this exchange format (OI_TARGET, OI_WAVELENGTH, OI_VIS, OI_VIS2, OI_T3) have been included as additional tables.

2.5 CONVENTIONS

Following the convention used in [1], FITS keywords can be either integer (I), real (R) with the allowed notations 1.,1.0,1.E+00, string (S) or booleans (L) having value of either True (T) or False (F).

Following the FITS standard [3], the following convention has been used for the description of the column formats of the FITS binary tables:

A = ASCII Character
I = 2-byte INTEGER
J = 4-byte INTEGER
E = 4-byte REAL
D = 8-byte DOUBLE
C = COMPLEX

Names and formats of a number of table extension types are predefined. If an instrument produces data of a type appropriate to one of these predefined extensions, then it should be used, including all definitions of names and formats.

New keywords, in addition to those defined here, may be added by individual instrument software designers and new columns may also be appended to those in the predefined tables after submission to DICB. The detailed formats of these tables may vary depending on the instrument, but should be compliant with the DICB conventions [1].

The dimension of binary table columns elements is specified with the usual FITS notation, e.g. 16D for an array of 16 DOUBLE. Whenever the size of the array refers to the value of a header keyword, a square bracket notation is used, e.g. D[NPOLY] for an array of NPOLY elements of type DOUBLE.

The descriptions of these extensions are given in the following sections.

3 VLT INTERFEROMETRY TABLES

3.1 ARRAY_DESCRIPTION

3.1.1 Description

This table provides the meaning of the indexes used in the ARRAY_GEOMETRY and OPTICAL_TRAIN tables. This table is automatically included in the final FITS file by BOSS [2]. The content of this table shall be updated as more VLTI subsystems are added. The successive versions of this table are identified by the ESO ISS ID keyword. An example of such table is provided in Section 3.1.4. A lists of station indexes is provided in Section 3.1.5.

3.1.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'ARRAY_DESCRIPTION'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO ISS DID	'ESO-VLT-DIC.ISS'	Data dictionary name
(S)	ESO ISS ID	'v 1.21'	ISS software version string

3.1.3 Table Columns

Format	Column	Example	Description
32A	BINTABLE	'OPTICAL_TRAIN'	Binary table
32A	OPTI_NAME	'SWYARD2'	Name of the optical element and corresponding column in the binary table
I	VALUE	3	Integer value of the index
128A	DESCRIPTION	'UT3'	Short description of the entry
128A	REFERENCE	'VLT-SPE-ESO-15840-2346/1.1, p. 67'	Bibliographic reference

The names of optical elements declared in this table describe the VLTI Delay Line system. Elements already used include DLY_LINE, LAB_INPUT1, SWYARD1, LAB_INPUT2, SWYARD2, FEED_MIDI, FEED_VINCI, FEED_FSU, FEED_PRIMA_A, FEED_PRIMA_B, FEED_AMBER. The following Section 3.1.4 provides an example of table ARRAY_DESCRIPTION.

3.1.4 Example

BINTABLE	COLUMN	VALUE	DESCRIPTION	REFERENCE
OPTICAL_TRAIN	TELESCOPE	0	TELESCOPE_NAME_NONE	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	1	TELESCOPE_NAME_UT1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	2	TELESCOPE_NAME_UT2	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	3	TELESCOPE_NAME_UT3	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	4	TELESCOPE_NAME_UT4	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	5	TELESCOPE_NAME_SID1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	6	TELESCOPE_NAME_SID2	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	7	TELESCOPE_NAME_AT1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	8	TELESCOPE_NAME_AT2	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	TELESCOPE	9	TELESCOPE_NAME_AT3	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	DLY_LINE	0	DL_ID_NONE, Physical delay line r	VLT-ICD-ESO-15000-1918, p.24, Fig. 3.6
OPTICAL_TRAIN	DLY_LINE	1	DL_ID_DL1, Physical delay line nu	VLT-ICD-ESO-15000-1918, p.24, Fig. 3.6
OPTICAL_TRAIN	DLY_LINE	2	DL_ID_DL2, Physical delay line nu	VLT-ICD-ESO-15000-1918, p.24, Fig. 3.6
OPTICAL_TRAIN	DLY_LINE	3	DL_ID_DL3, Physical delay line nu	VLT-ICD-ESO-15000-1918, p.24, Fig. 3.6
OPTICAL_TRAIN	DLY_LINE	4	DL_ID_DL4, Physical delay line nu	VLT-ICD-ESO-15000-1918, p.24, Fig. 3.6
OPTICAL_TRAIN	DLY_LINE	5	DL_ID_DL5, Physical delay line nu	VLT-ICD-ESO-15000-1918, p.24, Fig. 3.6
OPTICAL_TRAIN	DLY_LINE	6	DL_ID_DL6, Physical delay line nu	VLT-ICD-ESO-15000-1918, p.24, Fig. 3.6
OPTICAL_TRAIN	LAB_INPUT1	1	INPUT_1, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	LAB_INPUT1	2	INPUT_2, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	LAB_INPUT1	3	INPUT_3, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	LAB_INPUT1	4	INPUT_4, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	LAB_INPUT1	5	INPUT_5, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	LAB_INPUT1	6	INPUT_6, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	LAB_INPUT1	7	INPUT_7, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	LAB_INPUT1	8	INPUT_8, Lab Input Channel 1	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	SWYARD2	0	SWYARD_NONE, Switchyard conf	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	SWYARD2	1	SWYARD_DIRECT, Switchyard co	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	SWYARD2	2	SWYARD_BEAM_COMP, Switchy	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	SWYARD2	3	SWYARD_DIFFERENTIAL, Switch	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	FEED_MIDI	0	INS_FEED_OPT_NOT_CONF, Sw	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	FEED_MIDI	1	INS_FEED_OPT_FREE, Switchyar	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	FEED_MIDI	2	INS_FEED_OPT_MIRROR, Switch	VLT-ICD-ESO-15410-2117-
OPTICAL_TRAIN	FEED_MIDI	3	INS_FEED_OPT_DICHROIC, Swit	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	0	NONE	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	1	A0	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	2	A1	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	3	B0	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	4	B1	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	5	B2	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	6	B3	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	7	B4	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	8	B5	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	9	C0	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	10	C1	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	11	C2	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	12	C3	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	13	D0	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	14	D1	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	15	D2	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	16	E0	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	17	G0	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	18	G1	VLT-ICD-ESO-15410-2117-
ARRAY_GEOMETRY	STA_INDEX	19	G2	VLT-ICD-ESO-15410-2117-

3.1.5 Station Indexes

The following table provides the complete list of VLTI station indexes.

Index	VLTI Station
0	NONE
1	A0
2	A1
3	B0
4	B1
5	B2
6	B3
7	B4
8	B5
9	C0
10	C1
11	C2
12	C3
13	D0
14	D1
15	D2
16	E0
17	G0
18	G1
19	G2
20	H0
21	I1
22	J1
23	J2
24	J3
25	J4
26	J5
27	J6
28	K0
29	L0
30	M0
31	U1
32	U2
33	U3
34	U4

3.2 ARRAY_GEOMETRY

3.2.1 Description

This table provides the positions and characteristics of the telescopes used in the observation. Each element of the interferometric array is described by a row in the table. An element is referenced using the station index (Section 3.1.5). This table is automatically included in the final FITS file by BOSS. Details of this software library and related topics are described in [2].

3.2.2 Table Header

The header provides the coordinates of the interferometric array in the geocentric coordinate frame. The values ARRAYX, ARRAYY, ARRAYZ are determined for Paranal and are stored in the table header.

Type	Keyword	Example	Unit	Description
(S)	EXTNAME	'ARRAY_GEOMETRY'		Extension name
(S)	ORIGIN	'ESO-PARANAL'		Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'		ESO Telescope Name
(S)	DATE	'2001-11-01T20:37:22.8462'		HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO ISS DID	'ESO-VLT-DIC.ISS'		Data dictionary name
(S)	ESO ISS ID	'v 1.21'		ISS software version string
(S)	ARRNAME	'VLTI'		Name of the array, e.g. 'VLTI'.
(S)	FRAME	'GEOCENTRIC'		Coordinate frame, e.g. 'GEOCENTRIC'.
(R)	ARRAYX	-5.483173E6	m	X coordinate of the array centre in the above frame
(R)	ARRAYY	1.951952E6	m	Y coordinate of the array centre in the above frame
(R)	ARRAYZ	-2.668147E6	m	Z coordinate of the array centre in the above frame

3.2.3 Table Columns

There is one row per interferometric arm (up to three rows for the VLTI in the current configuration). The value of the INDEX column is cross-referenced with the entries in the ARRAY_DESCRIPTION table.

Format	Column	Example	Unit	Description
8A	TEL_NAME	SID1		Telescope name
8A	STA_NAME	E0		Station name
I	STA_INDEX	16		Station number, defined in ARRAY_DESCRIPTION (see Section 3.1.5)
E	DIAMETER	4E-01	m	Diameter [m] of telescopes input pupil aperture (8.0, 1.8 or 0.4 for UT, AT or SID).
3D	STAXYZ	40.19,25.47,0.	m	Same as XYZ coordinates in main FITS header.
I	MNTSTA	3		Type of mount. 0 for UT and AT (alt-az), 3 for SID (siderostat).

3.3 OPTICAL_TRAIN

3.3.1 Description

The OPTICAL_TRAIN table provides a description of the path taken by photons from the initial optical element to the entrance of the instrument. The optical elements encountered by photons are described by a row in the table. Every combination of telescope, delay-line, etc. used in the IMAGING_DATA table has a separate row. Array specific entries should be added to this table. This table is automatically included in the final FITS file by BOSS [2].

3.3.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'OPTICAL_TRAIN'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO ISS DID	'ESO-VLT-DIC.ISS'	Data dictionary name
(S)	ESO ISS ID	'v 1.21'	ISS software version string
(S)	ESO ISS ARRNAME	'VLTI'	Name of the array, e.g. 'VLTI'.
(I)	NOPTI	12	Number of optical elements

3.3.3 Table Columns

This table has one row per interferometric arm (up to three rows for the VLTI in the current configuration). This table maps the structure of the ARRAY_GEOMETRY table with the same number of rows and same telescope order. The INDEX and TEL_NAME columns are a running index. All other columns are indexes referenced in the ARRAY_DESCRIPTION table. The keyword NOPTI is the total number of column pairs (OPTI_NAMEj, VALUEj).

Format	Column	Example	Description
I	INDEX	2	VLTI interferometric arm, index running from 1 to n.
4A	TEL_NAME	'SID1	Telescope name, identical to the column TEL_NAME in ARRAY_GEOMETRY
32A	OPTI_NAMEj	'LAB_INPUT1'	Name of the optical element j, with j an index running from 1 to NOPTI
I	VALUEj	3	Value of the optical element (OPTI_NAMEj) setting. This value is described in the ARRAY_DESCRIPTION table.

3.4 IMAGING_DETECTOR

3.4.1 Description

This table describes the setup and characteristics of the 2-dimensional detector(s) used to record photometric and visibility data.

The keyword section contains general information about the detector(s) as a whole, such as their number, size and engineering parameters (temperature, setup voltages etc.). Additionally, it is assumed that each detector consists of a rectangular array of pixels, which is logically divided into one or more rectangular sub-arrays. In the simplest case, there is only one such array, covering the whole detector, but there may be several, covering different spatial filters, spectral arrays, telescope combinations etc.

Rectangular regions of the detector array(s) are described in terms of the x and y coordinates of the lower corner and the size of the pixel array. There is one row in this table for each region. Detector pixel arrays are to be stored consecutively, with the ``x" dimension varying in the inner loop (i.e. fastest). Pixel numbering starts with 1. Pixel order should be maintained in the sub-regions, i.e. increasing pixel number is the same in both the full detector array and in the region stored. When possible, the conversion between pixel and physical values in each sub-region is expressed using the conventions of the World Coordinates System (WCS).

3.4.2 Table Header

	Keyword	Example	Description
(S)	EXTNAME	'IMAGING_DETECTOR'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO DET DID	'ESO-VLT-DIC.IRACE-1.20'	Data dictionary name
(S)	ESO DET ID	'v 1.21'	DCS software version string
(I)	NDETECT	1	The number of detectors used in the instrument
(I)	NREGION	5	The number of regions used in the current mode
(I)	MAX_COEF	2	The maximum number of higher order polynomial coefficients for the DMP and DMC arrays.
(I)	NUM_DIM	2	The number of dimensions in the detector array
(I)	MAXTEL	2	The maximum number of telescopes contributing photons to the interferometer. It gives the dimension of PORTS.

3.4.3 Table Columns

Format	Column	Example	Unit	Description
I	REGION	1		The region number that is being described by this row.
I	DETECTOR	1		The detector that is on this region, index defined in INS_DESCRIPTION
I[MAXTEL]	PORTS			The entrance ports of the interferometer that contribute to this region. These are independent of the optical train supplying photons to the port.
I	CORRELATION	1		Correlation type, 0=background (no signal), 1=photometric, 2=interferometric.
16A	REGNAME	PA		A descriptive name for the region, e.g. I1, I2, PA, PB, or QL
2I	CORNER	12,4		This defines the corner of this region on the detector as low value of x, low value of y, inclusive.
D	GAIN	2.6	e-/ADU	The detector conversion factor from electrons to ADU.
2I	NAXIS	1,1		This gives the dimension of the data array in the ``x" and ``y" dimension.
2D	CRVAL	1.0,1.0	degrees or Hz	The coordinate reference values at the reference pixels on the ``x", and ``y" axes for this region. Angles are in degrees and frequencies in Hz.
2E	CRPIX	1.0,1.0		The reference pixel on the ``x" and ``y" axes for this region. Pixels are relative to the region corner, i.e. the low pixel number corner in the region is pixel (1,1). These need be neither integers nor in the actual region.
A[8,2]	CTYPE	'PIXEL'		The coordinate types for the ``x" and ``y" axes of this region. Standard WCS conventions are used.
D[2,2]	CD	1.,0.,0.,1.		Standard WCS conventions are used. This transformation is applied after the DMPn/DMCn transformation.
I[NUM_DIM, NUM_DIM, MAX_COEF]	DMP	1.0,...		This array is used for the distortion correction of the raw data array. DMP and DMC describe a polynomial transformation from the input pixel coordinates to ``regularized" output pixel coordinates. If x_i is the value of *i*th input coordinate, relative to that of the reference pixel, and r_i is the *j*th regularised output coordinate relative to the same pixel then: $r_j = \sum_k c(j,k) \Pi_l x_l^{P(j,l,k)}$
D[NUM_DIM, MAX_COEF]	DMC	1.0,...		This array is used for the distortion correction of the raw data array. Elements of this array are coefficients of the term corresponding to the elements in DMC. This is applied before the CD matrix operation.

3.5 IMAGING_DATA

3.5.1 Description

This table contains the detector pixel data for a given exposure. Relevant data are stored as 2D sub-arrays of the detector.

The 2D sub-arrays of each region are stored as column entries with pixels on the ``x" axis being stored sequentially. Each row corresponds to a single exposure. Instrumental set-up and the relation of pixel numbers to physical values are given in the IMAGING_DETECTOR table. This table can also be used for both raw and smoothed values.

The format of the DATAj column can be of any type, depending on the detector. For raw data, the recommended format is signed integer. If data are averaged, floating point is used.

3.5.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'IMAGING_DATA'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO DET DID	'ESO-VLT-DIC.IRACE-1.20'	Data dictionary name
(S)	ESO DET ID	'v 1.21'	DCS software version string
(I)	NREGION	5	The number of regions used in the current mode
(I)	MAXTEL	2	The number of entries in the OPTICAL_TRAIN table
(I)	MAXINS	2	The number of entries in the INS_TRAIN table
(I)	MAXSTEP	572	The maximum number of steps (STEPPING_PHASE) in an observational cycle.

3.5.3 Table Columns

Format	Column	Example	Format	Description
D	TIME	5.2316E+4	days	Time tag for this exposure, the effective centroid. (Modified Julian Date, UTC)
I (recommended)	DATAj	-33		Two-dimensional data for region j (from 1 to NREGION). Dimensionality is given in the IMAGING_DETECTOR table for the relevant region. Data type depends on detector. Scaling and offset may be applied using TSCALn and TZEROn; where n is the column number for this column.
E	EXPTIME	215.0	s	Exposure time in second
I[MAXTEL]	OPT_TRAIN	2		A list of the optical trains corresponding to the entrance ports of the interferometer. These are given as indices (column INDEX,) in the OPTICAL_TRAIN table.
D[MAXTEL]	OPD		m	The total delays applied to each of the array elements.
D[MAXTEL]	LOCALOPD		m	Any OPD modulation delay added to each of the array elements.
I[MAXINS]	INS_TRAIN	2		A list of the optical trains corresponding to the entrance ports of the interferometer. These are given as indices (column INDEX) in the INS_TRAIN table. Default value is 0.
2E	OFFSET	0.,0.	degree	Pointing offset from the source position (in SOURCE table) in RA and dec. This allows rapid chopping offsets to be stored.
E	ROTATION	0.	degree	Rotation angle of the sky as seen by the detector array. This gives the angular position of the second detector axis on the sky, if relevant. The value is zero at the North, increasing to the East.
I	STEPPING_PHASE	113		For observational modes which require a number of steps in an observational cycle (e.g. several delay settings) this is the 1-relative step number in the cycle. This value is comprised between 1 and MAXSTEP.
1A	TARTYPj	'T'		Target type for region j: 'T' = target source, 'R' = reference source, 'S' = sky, 'B' = instrument background.
I	REFERENCE	1		The identity of the source that was used as the reference source for online fringe tracking, as an index (SOURCE_ID) into the SOURCE table. Default value is 1. Meant to be the source looked at for PRIMA. For FINITO it is the same source.
I	TARGETj	1		The source that is represented in DATAj, as an index (TARGET_ID) into the OI_TARGET table. The default value is 1 if no OI_TARGET table is used. The value is zero for TARTYPj of 1 or 2.

4 ADDITIONAL TABLES

4.1 INS_DESCRIPTION

4.1.1 Description

This table provides the meaning of the indexes used in the ARRAY_GEOMETRY and OPTICAL_TRAIN tables. The successive versions of this table are identified by the ESO ISS ID keyword. An example of table is provided in Section 4.2.4. The exact structure of this table must be defined for each VLTI instrument.

4.1.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'INS_DESCRIPTION'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO INS DID	'ESO-VLT-DIC.MIDI_ICS'	Data dictionary name
(S)	ESO INS ID	'MIDI/1.54'	INS software version string

4.1.3 Table Columns

Format	Column	Example	Description
32A	INSTRUME	'MIDI'	Instrument name
32A	BINTABLE	'INS_TRAIN'	Binary table
32A	OPTI_NAME	'MIRROR_34'	Name of the optical element
I	VALUE	3	Integer value of the index
128A	DESCRIPTION	'MIDI Entrance mirror no. 34'	Short description of the entry
128A	REFERENCE	'VLT-SPE-ESO-15840-2346/1.1, p. 67'	Bibliographic reference

4.1.4 Example

INSTRUME	BINTABLE	OPTI_NAME	VALUE	DESCRIPTION	REFERENCE
MIDI	IMAGING_DETECTOR	DETECTOR	1	MIDI HAWAII/DET-554672-1	VLT-SPE-ESO-15876-2871/1.2
MIDI	IMAGING_DETECTOR	DETECTOR	2	MIDI HAWAII/DET-554672-2	VLT-SPE-ESO-15876-2871/1.2
MIDI	INS_TRAIN	MIRROR_34	0	Mirror no. 34 (Free)	VLT-SPE-ESO-15876-2871/1.2
MIDI	INS_TRAIN	MIRROR_34	1	Mirror no. 34 (Path 1)	VLT-SPE-ESO-15876-2871/1.2
MIDI	INS_TRAIN	MIRROR_34	2	Mirror no. 34 (Path 2)	VLT-SPE-ESO-15876-2871/1.2
MIDI	INS_TRAIN	MIRROR_47	1	MIDI mirror no. 47 (pos.1)	VLT-SPE-ESO-15876-2871/1.2
MIDI	INS_TRAIN	MIRROR_47	2	MIDI mirror no. 47(pos. 2)	VLT-SPE-ESO-15876-2871/1.2

4.2 INS_TRAIN

4.2.1 Description

This table describes the path taken by photons from the initial optical element in the instrument train (i.e the first element after the VLTI feeding optics) to the interferometer instrument detector. The optical elements encountered by photons are described by a row in the table. Every combination of telescope, delay-line, etc. used in the IMAGING_DATA table has a separate row. Instrument specific entries are added to this table.

4.2.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'INS_TRAIN'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO INS DID	'ESO-VLT-DIC.MIDI_ICS'	Data dictionary name
(S)	ESO INS ID	'MIDI/1.54'	INS software version string
(I)	NOPTI	2	Number of optical elements

4.2.3 Table Columns

This table has one row per configuration of the instrument. All other columns are indexes referenced in the INS_DESCRIPTION table.

Format	Column	Example	Description
I	INDEX	2	Sequence index
32A	INSTRUME	'MIDI'	Ínstrument name
32A	OPTI_NAMEj	'MIRROR_34'	Name of the optical element j, with j in the range 1..NOPTI
I	VALUEj	2	Value of the optical element (OPTI_NAMEj) setting. This value is described in the INS_DESCRIPTION table.

4.2.4 Example

INDEX	INSTRUME	OPTI_NAME1	VALUE1	OPTI_NAME2	VALUE2
1	MIDI	MIRROR_34	0	MIRROR_47	1
2	MIDI	MIRROR_34	0	MIRROR_47	2
3	MIDI	MIRROR_34	1	MIRROR_47	1
4	MIDI	MIRROR_34	1	MIRROR_47	2
5	MIDI	MIRROR_34	2	MIRROR_47	1
6	MIDI	MIRROR_34	2	MIRROR_47	2

4.3 SCAN_DATA

4.3.1 Description

This table describes the scan-by-scan information. It is used for VINCI and is generated by the Detector Control System (DCS).

4.3.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'SCAN_DATA'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO DET DID	'ESO-VLT-DIC.IRACE-1.20'	Data dictionary name
(S)	ESO DET ID	'v 1.21'	DCS software version string

4.3.3 Table Columns

(one row per scan)

Format	Column	Example	Unit	Description
D	TIME	5.23356E+04	days	Time-tag for this measurement. (Modified Julian Date, UTC)
I	FRINGE	24		Number of fringes detected on this scan
D	DLOFFS	0.234	m	Delay-line offsets
D	SNRPA	23.5		Signal to noise ratio on the PA signal
D	SNRPB	18.9		Signal to noise ratio on the PB signal

4.4 OI_TARGET

4.4.1 Description

This table contains information about the observed sources. Position and velocity information is stored for each source, one source per row. This table conforms to the data exchange standard proposed by the IAU Working Group on Optical/IR Interferometry (Section 2.4). Not all data stored in this table are known during the observation. Missing values are indicated using IEEE null values.

4.4.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'SOURCE'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO INS DID	'VINCI_ICS'	Data dictionary name
(S)	ESO INS ID	'VINCI/1.54'	INS software version string
(I)	NBANDS	50	Maximum number of bands for flux densities.

4.4.3 Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Source number. This is an index used to reference this entry from other tables
16A	TARGET	'V* zet And'		Source name, SIMBAD name according to [5]
128A	REFERENC	'1997A&A...323L..49P'		Bibliographic references
8A	CALCODE	'C'		Calibrator [C] or science [S] code
E[NBANDS]	IFLUX	7.5	Jy	Integrated Stokes' I flux densities at the frequencies given in FREQ if it is a calibrator source.
E[NBANDS]	QFLUX	0.2	Jy	Stokes' Q flux densities at the frequencies given in FREQ if it is a calibrator source.
E[NBANDS]	UFLUX	0.012	Jy	Stokes' U flux densities at the frequencies given in FREQ if it is a calibrator source.
E[NBANDS]	VFLUX	0.003	Jy	Stokes' V flux densities at the frequencies given in FREQ if it is a calibrator source.
D[NBANDS]	WAVENUM	4.5454E+05	m-1	Frequencies for IFLUX, QFLUX, UFLUX and VFLUX. IEEE null values indicate no entry and the corresponding entries in IFLUX, etc. are undefined.
D	RAEPP	11.77854	degree	Right ascension at mean equinox
D	DECEPP	24.268334	degree	Declination at mean equinox.
E	EQUINOX	2000.	year	Equinox of RAEPP and DECEPP. This should be either '1950.0' or '2000.0'.
E	EPOCH	2002.1314674	year	Epoch of observation.
D	RAPP	-56.6354	degree	Apparent Right ascension at the beginning of observation
D	DECAPP	-34.6764	degree	Apparent Declination at the beginning of observation.
D	RA_ERR	0.0001	degree	Error in apparent RA
D	DEC_ERR	0.0001	degree	Error in apparent DEC
D	SYSVEL	120.	m/s	Systemic radial velocity
8A	VELTYP	'LSR'		Velocity type of SYSVEL. 'LSR'=Local standard of rest, 'BARYCENT'=Solar system barycenter, 'GEOCENTR'=Centre of mass of the earth, 'TOPOCENT'=Uncorrected.
8A	VELDEF	'OPTICAL'		Definition of radial velocity, 'OPTICAL' or 'RADIO'.
D	PMRA	-2.811944E-05	degree/year	Proper motion in RA
D	PMRA_ERR	2.E-07	degree/year	Error in proper motion in RA
D	PMDEC	-2.274722E-05	degree/year	Proper motion in Declination
D	PMDEC_ERR	3E-07	degree/year	Error in proper motion in Declination
E	PARALLAX	0.004999	degree	Parallax value
E	PARA_ERR	0.00001	degree	Error in parallax value
16A	SPECTYP	'A0V'		Spectral type
E	DIAMETER	0.0018888	degree	Uniform disk stellar model diameter
E	DIAM_ERR	9.444E-05	degree	RMS uncertainty in DIAMETER

4.5 OI_WAVELENGTH

4.5.1 Description

This table describes the spectral bands of detectors with a number of spectral channels. If there are multiple physical detectors, the effective wavelengths/bandwidths for each should be stored in different subsets of the table rows, i.e. the table describes a single "virtual"detector. This table conforms to the data exchange standard proposed by the IAU Working Group on Optical/IR Interferometry (Section 2.4).

4.5.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'SOURCE'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO INS DID	'VINCI_ICS'	Data dictionary name
(S)	ESO INS ID	'VINCI/1.54'	INS software version string
(I)	NWAVE	50	Maximum number of bands for flux densities.

4.5.3 Table Columns

Format	Column	Example	Unit	Description
E[NWAVE]	EFF_WAVE	2.25E-06	M	Effective wavelength of each channel
E[NWAVE]	EFF_BAND	4.78E-08	M	Effective bandpass of each channel

4.6 OI_VIS

4.6.1 Description

This table describes the partially calibrated visibility and related data. The IAU Working Group on Interferometry is working on a standard that should be included here. As shown in the following table and taking a slit as an example we notice that NAXIS1 could for instance refer to frequency. AMBER for example has three simultaneous measurements of the frequency (3 baselines). The index j refers to the baseline for multiple baseline systems. Each detector sub-system has two dimensions described by 1NAXISj and 2NAXISj and equivalent keywords. This table conforms to the data exchange standard proposed by the IAU Working Group on Optical/IR Interferometry (Section 2.4).

4.6.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'VISIBILITY'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO INS DID	'VINCI_ICS'	Data dictionary name
(S)	ESO INS ID	'VINCI/1.54'	INS software version string
(I)	1NAXISj	320	The extent of the first dimension in the array in the DATAj column where j is its column number in the table.
(I)	2NAXISj	5	The extent of the second dimension in the array in the DATAj column where j is its column number in the table.
(S)	1CTYPj	'FREQUENCY'	WCS type axis label for first dimension of array in column j of DATA1.
(S)	2CTYPj	'SLIT_POS.'	WCS type axis label for second dimension of array in column j of DATA2
(R)	1CRVLj	1.58E14	Reference value at reference pixel of first dimension of array in column j. Reference frequency at the beginning in Hz.
(R)	2CRVLj	-0.01	Reference value at reference pixel of second dimension of array in column j. FITS standard for angles is degrees.
(R)	1CRPXj	1.0	Reference pixel of first dimension of array in column j
(R)	2CRPXj	1.0	Reference pixel of second dimension of array in column j
(R)	1CD1j	1.0	Element CD_1_1 of CD matrix of array in column j
(R)	1CD2j	0.0	Element CD_1_2 of CD matrix of array in column j
(R)	2CD1j	0.0	Element CD_2_1 of CD matrix of array in column j
(R)	2CD2j	1.0	Element CD_2_1 of CD matrix of array in column j
(I)	NINTERF	3	Number of interferometric baselines

4.6.3 Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Target identity. This is an index in the OI_TARGET table.
D	TIME	5.334e4	days	Time tag for this exposure, the effective centroid. (Modified Julian Date, UTC)
E	INT_TIME	267.0	s	Total integration time for this measured visibility
C	VISDATA	(-33.67,78.90)		Visibility stored as a complex number
C	VISERR	(2.67,7.56)		Error in the visibility (complex number)
E	VISWEIGHT	1.0		Weights for each element in VISDATA, non-positive indicates invalid data.
D	UCOORD	146.5	m	U coordinates of the data
D	VCOORD	11.23	m	V coordinates of the data
D	WCOORD	24.5	m	W coordinates of the data
2I	STATNUM	1,3		Station numbers as defined in the ARRAY_DESCRIPTION table.

4.7 OI_VIS2

4.7.1 Description

This table describes the partially calibrated visibility and related data. The IAU Working Group on Interferometry is working on a standard that should be included here. As shown in the following table and taking a slit as an example we notice that NAXIS1 could for instance refer to frequency. AMBER for example has three simultaneous measurements of the frequency (3 baselines). The index j refers to the baseline for multiple baseline systems. Each detector sub-system has two dimensions described by 1NAXISj and 2NAXISj and equivalent keywords. This table conforms to the data exchange standard proposed by the IAU Working Group on Optical/IR Interferometry (Section 2.4).

4.7.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'VISIBILITY'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO INS DID	'VINCI_ICS'	Data dictionary name
(S)	ESO INS ID	'VINCI/1.54'	INS software version string
(I)	NINTERF	3	Number of interferometric baselines

4.7.3 Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Target identity. This is an index in the OI_TARGET table.
D	TIME	5.334e4	days	Time tag for this exposure, the effective centroid. (Modified Julian Date, UTC)
E	INT_TIME	267.0	s	Total integration time for this measured visibility
C	VIS2DATA	(-33.67,78.90)		Visibility stored as a complex number
C	VIS2ERR	(2.67,7.56)		Error in the visibility (complex number)
E	VIS2WEIGHT	1.0		Weights for each element in VISDATA, non-positive indicates invalid data.
D	UCOORD	146.5	m	U coordinates of the data
D	VCOORD	11.23	m	V coordinates of the data
D	WCOORD	24.5	m	W coordinates of the data
2I	STATNUM	1,3		Station numbers as defined in the ARRAY_DESCRIPTION table.

4.8 OI_T3

4.8.1 Description

This table describes the partially calibrated visibility and related data. The IAU Working Group on Interferometry is working on a standard that should be included here. As shown in the following table and taking a slit as an example we notice that NAXIS1 could for instance refer to frequency. AMBER for example has three simultaneous measurements of the frequency (3 baselines). The index j refers to the baseline for multiple baseline systems. Each detector sub-system has two dimensions described by 1NAXISj and 2NAXISj and equivalent keywords. This table conforms to the data exchange standard proposed by the IAU Working Group on Optical/IR Interferometry (Section 2.4).

4.8.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'VISIBILITY'	Extension name
(S)	ORIGIN	'ESO-PARANAL'	Origin of file
(S)	TELESCOP	'ESO-VLTI-S12'	ESO Telescope Name
(S)	INSTRUME	'VINCI'	Instrument name
(R)	MJD-OBS	52331.65282567	Observation Start (Modified Julian Date)
(S)	DATE-OBS	'2001-11-01T20:37:20.5064'	Observation Start (YYYY-MM-DDThh:mm:ss UTC)
(S)	DATE	'2001-11-01T20:37:22.8462'	HDU creation date (YYYY-MM-DDThh:mm:ss UTC)
(S)	ESO INS DID	'VINCI_ICS'	Data dictionary name
(S)	ESO INS ID	'VINCI/1.54'	INS software version string
(I)	NINTERF	3	Number of interferometric baselines

4.8.3 Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Target identity. This is an index in the OI_TARGET table.
D	TIME	5.334e4	days	Time tag for this exposure, the effective centroid. (Modified Julian Date, UTC)
E	INT_TIME	267.0	s	Total integration time for this measured visibility
C	T3AMP	(-33.67,78.90)		Visibility stored as a complex number
C	T3AMPERR	(2.67,7.56)		Error in the visibility (complex number)
C	T3PHI	(-33.67,78.90)		Visibility stored as a complex number
C	T3PHIERR	(2.67,7.56)		Error in the visibility (complex number)
E	T3WEIGHT	1.0		Weights for each element in VISDATA, non-positive indicates invalid data.
D	U1COORD	146.5	m	U coordinates of the data
D	V1COORD	11.23	m	V coordinates of the data
D	W1COORD	24.5	m	W coordinates of the data
D	U2COORD	146.5	m	U coordinates of the data
D	V2COORD	11.23	m	V coordinates of the data
D	W2COORD	24.5	m	W coordinates of the data
2I	STATNUM	1,3		Station numbers as defined in the ARRAY_DESCRIPTION table.

5 EXAMPLE HEADERS AND DICTIONARIES

5.1 PRIMARY HEADER

```
SIMPLE  =                    T / file does conform to FITS standard
BITPIX  =                   16 / number of bits per data pixel
NAXIS   =                    0 / number of data axes
ORIGIN  = ‘ESO-PARANAL’    / Origin of file
TELESCOP= 'ESO-VLTI-S12'                / ESO Telescope Name
INSTRUME= 'VINCI   '                    / Instrument used.
RA      =           338.867750          / 22:35:28.2 RA (J2000) pointing (deg)
DEC     =            -39.27026          / -39:16:12.9 DEC (J2000) pointing (deg)
EQUINOX =                2000.          / Standard FK5 (years)
RADECSYS= 'FK5     '                    / Coordinate reference frame
EXPTIME = 0.030 / Integration time
MJD-OBS = 52331.65282567 / Obs Start
DATE-OBS= 2002-02-26T15:40:04.1378 / Obs Start (UTC)
UTC     =            55825.367          / 15:30:25.367 UTC at start (sec)
LST     =            76441.816          / 21:14:01.816 LST at start (sec)
EXTEND  =                    T / Auto Added Keyword
COMMENT   FITS (Flexible Image Transport System) format defined in Astronomy and
COMMENT   Astrophysics Supplement Series v44/p363, v44/p371, v73/p359, v73/p365.
COMMENT   Contact the NASA Science Office of Standards and Technology for the
COMMENT   FITS Definition document #100 and other FITS information.
COMMENT   INSTRUME= 'VINCI'  / Name of instrument
COMMENT   Tests of binary table (alo, rka and tph)   /  Piropo for C.
HIERARCH ESO COU GUID MODE   = 'NONE    '   / VLTI mode of Coude guiding
HIERARCH ESO COU GUID STATUS = 'OFF     '   / VLTI guiding substate
HIERARCH ESO DEL DLT1 OPL END= 18.570501925 / Position at end for delay line 1
HIERARCH ESO DEL DLT1 OPL START= 18.565853518 / Position at start for delay line
HIERARCH ESO DEL DLT2 OPL END= 47.793000606 / Position at end for delay line 2
HIERARCH ESO DEL DLT2 OPL START= 47.793000230 / Position at start for delay line
HIERARCH ESO DEL FT STATUS   = 'OFF     '   / Fringe Tracker Status
HIERARCH ESO DEL OPD OFFSET  =  0.000000000 / optical path difference offset
HIERARCH ESO DEL REF NAME    = 'DL3     '   / Reference DEL Name
HIERARCH ESO DEL REF OPL     = 110.000000000 / position
HIERARCH ESO DET CHIP ID     = 'ESO-Hawaii' / Detector ID
HIERARCH ESO DET CHIP NAME   = 'Hawaii' / Detector name
HIERARCH ESO DET CHIP NX     = 1024 / Pixels in X
HIERARCH ESO DET CHIP NY     = 1024 / Pixels in Y
HIERARCH ESO DET CHIP PXSPACE= 1.800e-05 / Pixel-Pixel Spacing
HIERARCH ESO DET CHIP TYPE   = 'IR' / The Type of Det Chip
HIERARCH ESO DET CHOP FREQ   = 0 / Chopping Frequency
HIERARCH ESO DET CON OPMODE  = 'SIMULATION' / Operational Mode
HIERARCH ESO DET DACQ MODE   = 0 / 0:No wave 1:Rising + Falling slopes 2:Rising
HIERARCH ESO DET DID         = 'ESO-VLT-DIC.IRACE-1.20' / Dictionary Name and Re
HIERARCH ESO DET DIT         = 0.0296 / Integration Time
HIERARCH ESO DET DITDELAY    = 0.000 / Pause Between DITs
HIERARCH ESO DET IRACE ADC1 DELAY= 1 / ADC Delay Adjustment
HIERARCH ESO DET IRACE ADC1 ENABLE= 1 / Enable ADC Board (0/1)
HIERARCH ESO DET IRACE ADC1 FILTER1= 0 / ADC Filter1 Adjustment
HIERARCH ESO DET IRACE ADC1 FILTER2= 0 / ADC Filter2 Adjustment
HIERARCH ESO DET IRACE ADC1 HEADER= 4 / Header of ADC Board
HIERARCH ESO DET IRACE ADC1 NAME= 'ADC-G1' / Name for ADC Board
HIERARCH ESO DET IRACE SEQCONT= 'F' / Sequencer Continuous Mode
HIERARCH ESO DET MODE NAME   = '' / DCS Detector Mode
HIERARCH ESO DET NC BATCH    = 0 / Observation id
HIERARCH ESO DET NC NSAMPPIX = 1 / # of Samples/Pixel
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HIERARCH ESO DET NC NSCAN    = 1 / Scans per batch
HIERARCH ESO DET NCORRS      = 6 / Read-Out Mode
HIERARCH ESO DET NCORRS NAME = 'beam1x1' / Read-Out Mode Name
HIERARCH ESO DET NDIT        = 1 / # of Sub-Integrations
HIERARCH ESO DET NDITSKIP    = 0 / DITs skipped at 1st.INT
HIERARCH ESO DET QL BEAMI1   = 1 / beam indicator for channel I1
HIERARCH ESO DET QL BEAMI2   = 2 / beam indicator for channel I2
HIERARCH ESO DET QL DBLCHK   = 1 / Enable fringe double check
HIERARCH ESO DET QL DETLEVEL = 5 / detection threshold
HIERARCH ESO DET QL FRAMERATE= 725 / frame rate
HIERARCH ESO DET QL FRINGESPD= 0.00031 / fringe speed
HIERARCH ESO DET QL GAINHW   = 0.02 / gain half width
HIERARCH ESO DET QL INSMODE  = 0 / 0:UNDEFINED 1:AUTOTEST 2:AUTOCOLL 3:STARINTF
HIERARCH ESO DET QL MAXWAVEK = 2.5E-06 / max wave length K
HIERARCH ESO DET QL MAXWAVEOFF= 1.3E-06 / max wave length off source
HIERARCH ESO DET QL MINWAVEK = 1.95E-06 / min wave length K
HIERARCH ESO DET QL MINWAVEOFF= 1.06E-06 / min wave length off source
HIERARCH ESO DET QL OBSMODE  = 1 / 0:UNDEFINED 1:OFFSOURCE 2:BEAMA 3:BEAMB 4:ONS
HIERARCH ESO DET QL OPDST    = 0 / Enable offset to be sent to DL
HIERARCH ESO DET QL PIST     = 0 / Enable peak integral computation
HIERARCH ESO DET QL ST       = 1 / Enable quicklook computation
HIERARCH ESO DET RM NFRAM    = 100 / Frames per scan
HIERARCH ESO DET RSPEED      = 4 / Read-Speed Factor
HIERARCH ESO DET RSPEEDADD   = 0 / Read-Speed Add
HIERARCH ESO DET WIN NX      = 128 / # of Pixels in X
HIERARCH ESO DET WIN NY      = 128 / # of Pixels in Y
HIERARCH ESO DET WIN STARTX  = 1 / Lower left X ref
HIERARCH ESO DET WIN STARTY  = 1 / Lower left Y ref
HIERARCH ESO DET WIN TYPE    = 0 / Win-Type: 0=SW/1=HW
HIERARCH ESO DET WIN1 NX     = 1 / # of pixels along X window 1
HIERARCH ESO DET WIN1 NY     = 1 / # of pixels along Y window 1
HIERARCH ESO DET WIN1 STRX   = 12 / Start X window 1
HIERARCH ESO DET WIN1 STRY   = 4 / Start Y window 1
HIERARCH ESO DET WIN2 NX     = 1 / # of pixels along X window 2
HIERARCH ESO DET WIN2 NY     = 1 / # of pixels along Y window 2
HIERARCH ESO DET WIN2 STRX   = 21 / Start X window 2
HIERARCH ESO DET WIN2 STRY   = 8 / Start Y window 2
HIERARCH ESO DET WIN3 NX     = 1 / # of pixels along X window 3
HIERARCH ESO DET WIN3 NY     = 1 / # of pixels along Y window 3
HIERARCH ESO DET WIN3 STRX   = 8 / Start X window 3
HIERARCH ESO DET WIN3 STRY   = 13 / Start Y window 3
HIERARCH ESO DET WIN4 NX     = 1 / # of pixels along X window 4
HIERARCH ESO DET WIN4 NY     = 1 / # of pixels along Y window 4
HIERARCH ESO DET WIN4 STRX   = 16 / Start X window 4
HIERARCH ESO DET WIN4 STRY   = 17 / Start Y window 4
HIERARCH ESO DPR CATG        = 'TEST    '   / Observation category
HIERARCH ESO DPR TECH        = 'INTERFEROMETRY' / Observation technique
HIERARCH ESO DPR TYPE        = 'DARK    '   / Observation type
HIERARCH ESO INS DID         = 'VINCI_ICS'  / Data dictionary for INS.
HIERARCH ESO INS FILT1 ID    = 'PS6     '   / Filter unique id.
HIERARCH ESO INS FILT1 NAME  = 'CLOSED  '   / Filter common name.
HIERARCH ESO INS FILT1 NO    =            6 / Filter wheel position index.
HIERARCH ESO INS FILT1 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS FOCU1 POS   =     7500.000 / Position [mum].
HIERARCH ESO INS FOCU1 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS FOCU2 POS   =    17250.000 / Position [mum].
HIERARCH ESO INS FOCU2 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS FOCU3 POS   =    17250.000 / Position [mum].
HIERARCH ESO INS FOCU3 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS FOCU4 POS   =       15.000 / Position [mum].
HIERARCH ESO INS FOCU4 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS ID          = 'VINCI/1.54' / Instrument ID.
HIERARCH ESO INS LAMP1 SWSIM =            T / If T, function is software simulat
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HIERARCH ESO INS LAMP2 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS LAMP3 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS MIRR1 ID    = 'PZT     '   / Mirror unique ID.
HIERARCH ESO INS MIRR1 NAME  = 'Fast Scan'  / Mirror common name.
HIERARCH ESO INS MIRR1 NSCAN =           0 / Number of repeated scans
HIERARCH ESO INS MIRR1 RANGE =    -9999.000 / Data Acq. Total OPD Range [mum].
HIERARCH ESO INS MIRR1 SPEED =    -9999.000 / Data Acq. Fringe Velocity [mum/s].
HIERARCH ESO INS MIRR1 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS MIRR1 UTC1  =   0.00000000 / UTC at batch start/end (1970-01-01
HIERARCH ESO INS MIRR1 UTC2  =   0.00000000 / UTC at batch start/end (1970-01-01
HIERARCH ESO INS MIRR2 ID    = 'P2      '   / Mirror unique ID.
HIERARCH ESO INS MIRR2 NAME  = 'ALI4    '   / Mirror common name.
HIERARCH ESO INS MIRR2 NO    =           3 / Mirror slide position.
HIERARCH ESO INS MIRR2 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS MODE        = 'AUTOTEST'   / Instrument mode used.
HIERARCH ESO INS OPTI1 POS   =    17250.000 / Position [mum].
HIERARCH ESO INS OPTI1 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS OPTI2 ID    = 'P0      '   / General Optical device unique ID.
HIERARCH ESO INS OPTI2 NAME  = 'OUT     '   / General Optical device common name
HIERARCH ESO INS OPTI2 NO    =           1 / Slot number.
HIERARCH ESO INS OPTI2 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS OPTI3 ID    = 'P1      '   / General Optical device unique ID.
HIERARCH ESO INS OPTI3 NAME  = 'ALI1    '   / General Optical device common name
HIERARCH ESO INS OPTI3 NO    =           2 / Slot number.
HIERARCH ESO INS OPTI3 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS OPTI4 ID    = 'P1      '   / General Optical device unique ID.
HIERARCH ESO INS OPTI4 NAME  = 'ALI5    '   / General Optical device common name
HIERARCH ESO INS OPTI4 NO    =           2 / Slot number.
HIERARCH ESO INS OPTI4 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS OPTI5 ID    = 'P1      '   / General Optical device unique ID.
HIERARCH ESO INS OPTI5 NAME  = 'BSA1    '   / General Optical device common name
HIERARCH ESO INS OPTI5 NO    =           2 / Slot number.
HIERARCH ESO INS OPTI5 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS OPTI6 ID    = 'P1      '   / General Optical device unique ID.
HIERARCH ESO INS OPTI6 NAME  = 'BSB1    '   / General Optical device common name
HIERARCH ESO INS OPTI6 NO    =           2 / Slot number.
HIERARCH ESO INS OPTI6 SWSIM =           T / If T, function is software simulat
HIERARCH ESO INS PATH        = 'NO_BATCH'   / Optical path used.
HIERARCH ESO INS ROT1 POS    =    7500.0000 / Position angle (N=0 E=90) [deg].
HIERARCH ESO INS ROT1 SWSIM  =           T / If T, function is software simulat
HIERARCH ESO INS ROT2 POS    =       0.0000 / Position angle (N=0 E=90) [deg].
HIERARCH ESO INS ROT2 SWSIM  =           T / If T, function is software simulat
HIERARCH ESO INS ROT3 POS    =       0.0000 / Position angle (N=0 E=90) [deg].
HIERARCH ESO INS ROT3 SWSIM  =           T / If T, function is software simulat
HIERARCH ESO INS SENS1 ID    = 'ALI9    '   / sensor ID.
HIERARCH ESO INS SENS1 NAME  = 'ALI9 position' / sensor common name.
HIERARCH ESO INS SENS1 STAT  = 'OK      '   / Digital Sensor current status.
HIERARCH ESO INS SENS10 ID   = 'FI7     '   / sensor ID.
HIERARCH ESO INS SENS10 NAME = 'FIB7 status' / sensor common name.
HIERARCH ESO INS SENS10 STAT = '0       '   / Digital Sensor current status.
HIERARCH ESO INS SENS11 ID   = 'FI8     '   / sensor ID.
HIERARCH ESO INS SENS11 NAME = 'FIB8 status' / sensor common name.
HIERARCH ESO INS SENS11 STAT = '0       '   / Digital Sensor current status.
HIERARCH ESO INS SENS12 ID   = 'FI9     '   / sensor ID.
HIERARCH ESO INS SENS12 NAME = 'FIB9 status' / sensor common name.
HIERARCH ESO INS SENS12 STAT = '0       '   / Digital Sensor current status.
HIERARCH ESO INS SENS13 ID   = 'FI10    '   / sensor ID.
HIERARCH ESO INS SENS13 NAME = 'FIB10 status' / sensor common name.
HIERARCH ESO INS SENS13 STAT = '0       '   / Digital Sensor current status.
HIERARCH ESO INS SENS14 ID   = 'FI11    '   / sensor ID.
HIERARCH ESO INS SENS14 NAME = 'FIB11 status' / sensor common name.
HIERARCH ESO INS SENS14 STAT = '0       '   / Digital Sensor current status.
HIERARCH ESO INS SENS15 ID   = 'FI12    '   / sensor ID.
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HIERARCH ESO INS SENS15 NAME = 'FIB12 status' / sensor common name.
HIERARCH ESO INS SENS15 STAT = '0       '   / Digital Sensor current status.
HIERARCH ESO INS SENS2 ID    = 'COMA    '   / sensor ID.
HIERARCH ESO INS SENS2 NAME  = 'COMA1 status' / sensor common name.
HIERARCH ESO INS SENS2 STAT  = 'OK      '   / Digital Sensor current status.
HIERARCH ESO INS SENS3 ID    = 'COMB    '   / sensor ID.
HIERARCH ESO INS SENS3 NAME  = 'COMB1 status' / sensor common name.
HIERARCH ESO INS SENS3 STAT  = 'OK      '   / Digital Sensor current status.
HIERARCH ESO INS SENS4 ID    = 'FI1     '   / sensor ID.
HIERARCH ESO INS SENS4 NAME  = 'FIB1 status' / sensor common name.
HIERARCH ESO INS SENS4 STAT  = 'PARK    '   / Digital Sensor current status.
HIERARCH ESO INS SENS5 ID    = 'FI2     '   / sensor ID.
HIERARCH ESO INS SENS5 NAME  = 'FIB2 status' / sensor common name.
HIERARCH ESO INS SENS5 STAT  = 'PARK    '   / Digital Sensor current status.
HIERARCH ESO INS SENS6 ID    = 'FI3     '   / sensor ID.
HIERARCH ESO INS SENS6 NAME  = 'FIB3 status' / sensor common name.
HIERARCH ESO INS SENS6 STAT  = 'PARK    '   / Digital Sensor current status.
HIERARCH ESO INS SENS7 ID    = 'FI4     '   / sensor ID.
HIERARCH ESO INS SENS7 NAME  = 'FIB4 status' / sensor common name.
HIERARCH ESO INS SENS7 STAT  = 'PARK    '   / Digital Sensor current status.
HIERARCH ESO INS SENS8 ID    = 'FI5     '   / sensor ID.
HIERARCH ESO INS SENS8 NAME  = 'FIB5 status' / sensor common name.
HIERARCH ESO INS SENS8 STAT  = 'PARK    '   / Digital Sensor current status.
HIERARCH ESO INS SENS9 ID    = 'FI6     '   / sensor ID.
HIERARCH ESO INS SENS9 NAME  = 'FIB6 status' / sensor common name.
HIERARCH ESO INS SENS9 STAT  = 'PARK    '   / Digital Sensor current status.
HIERARCH ESO INS SENSOR1 SWSIM=           T / If T, function is software simulat
HIERARCH ESO INS SHUT1 ID    = 'LKSH    '   / Shutter ID.
HIERARCH ESO INS SHUT1 NAME  = 'LaK_Shutt'  / Shutter name.
HIERARCH ESO INS SHUT1 ST    =            F / Shutter open.
HIERARCH ESO INS SHUT1 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS SWSIM       = 'NORMAL  '   / Software simulation.
HIERARCH ESO INS TILT1 POS   =    7500.000 / Position [mum].
HIERARCH ESO INS TILT1 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS TILT2 POS   =    5000.000 / Position [mum].
HIERARCH ESO INS TILT2 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS TILT3 POS   =    5000.000 / Position [mum].
HIERARCH ESO INS TILT3 SWSIM =            T / If T, function is software simulat
HIERARCH ESO INS TIP1 POS    =    7500.000 / Position [mum].
HIERARCH ESO INS TIP1 SWSIM  =            T / If T, function is software simulat
HIERARCH ESO INS TIP2 POS    =    5000.000 / Position [mum].
HIERARCH ESO INS TIP2 SWSIM  =            T / If T, function is software simulat
HIERARCH ESO INS TIP3 POS    =    5000.000 / Position [mum].
HIERARCH ESO INS TIP3 SWSIM  =            T / If T, function is software simulat
HIERARCH ESO ISS AIRM END    =       0.000 / Airmass at end
HIERARCH ESO ISS AIRM START  =       0.000 / Airmass at start
HIERARCH ESO ISS ALT         =      67.446 / Altitude angles at start
HIERARCH ESO ISS AMBI FWHM END=      -1.00 / Observatory seeing
HIERARCH ESO ISS AMBI FWHM START=    -1.00 / Observatory seeing
HIERARCH ESO ISS AMBI RHUM   =         12. / Relative humidity
HIERARCH ESO ISS AMBI TEMP   =       10.00 / Observatory ambient temperature.
HIERARCH ESO ISS AMBI WINDDIR=          0. / Wind direction
HIERARCH ESO ISS AMBI WINDSP =       10.00 / Observatory wind speed
HIERARCH ESO ISS AZ          =     315.344 / Azimuth angles at start
HIERARCH ESO ISS CHOP FREQ   =        0.00 / Frequency of cycle
HIERARCH ESO ISS CHOP NULLING= 'OFF     '   / Out of phase chopping
HIERARCH ESO ISS CHOP POSANG =       0.000 / Orientation on sky
HIERARCH ESO ISS CHOP PVRATIO=        0.00 / Peak-to-valley ratio
HIERARCH ESO ISS CHOP ST     = 'T       '   / Chopping status
HIERARCH ESO ISS CHOP THROW  =         0.0 / Amplitude of chopping
HIERARCH ESO ISS CONF DL1    = 'DL1     '   / Delay line used
HIERARCH ESO ISS CONF DL2    = 'DL3     '   / Delay line used
HIERARCH ESO ISS CONF INPUT1 =           3 / Input channel in lab
```

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HIERARCH ESO ISS CONF INPUT2 =            1 / Input channel in lab
HIERARCH ESO ISS CONF NTEL   =            2 / Number of telescopes used
HIERARCH ESO ISS CONF STATION1= 'E0      '  / Station of telescope 1
HIERARCH ESO ISS CONF STATION2= 'H0      '  / Station of telescope 2
HIERARCH ESO ISS CONF SWYARD1= 'compressed' / Switchyard configuration
HIERARCH ESO ISS CONF SWYARD2= 'compressed' / Switchyard configuration
HIERARCH ESO ISS CONF T1X    =     -30.7600 / Relative X coordinate
HIERARCH ESO ISS CONF T1Y    =      40.1959 / Relative Y coordinate
HIERARCH ESO ISS CONF T1Z    =       0.0000 / Relative Z coordinate
HIERARCH ESO ISS CONF T2X    =     -76.1501 / Relative X coordinate
HIERARCH ESO ISS CONF T2Y    =      24.5715 / Relative Y coordinate
HIERARCH ESO ISS CONF T2Z    =       0.0000 / Relative Z coordinate
HIERARCH ESO ISS DATE        = '2002-02-21T16:08:09.000' / VLTI release version
HIERARCH ESO ISS DID         = 'ESO-VLT-DIC.ISS' / Data dictionary name
HIERARCH ESO ISS GEOELEV     =    2681.0000 / VLTI site elevation
HIERARCH ESO ISS GEOLAT      =     -24.6279 / VLTI site latitude
HIERARCH ESO ISS GEOLON      =     -70.4048 / VLTI site longitude
HIERARCH ESO ISS ID          = 'VINCI/1.54  '   / ISS version string
HIERARCH ESO ISS OPER        = 'I I Condor' / Name of VLTI operator
HIERARCH ESO ISS PARANG END  =        0.000 / Parallactic angle at end
HIERARCH ESO ISS PARANG START=        0.000 / Parallactic angle at start
HIERARCH ESO ISS PBL12 END   =       47.337 / Projected baseline T1 T2 at end
HIERARCH ESO ISS PBL12 START =       47.337 / Projected baseline T1 T2 at start
HIERARCH ESO ISS TEMP LAB1   =        0.000 / Temp in lab
HIERARCH ESO ISS TEMP LAB2   =        0.000 / Temp in lab
HIERARCH ESO ISS TEMP LAB3   =        0.000 / Temp in lab eastern wall
HIERARCH ESO ISS TEMP LAB4   =        0.000 / Temp in lab
HIERARCH ESO ISS TEMP TUN1   =        0.000 / Temp in tunnel A west
HIERARCH ESO ISS TEMP TUN2   =        0.000 / Temp in tunnel centre
HIERARCH ESO ISS TEMP TUN3   =        0.000 / Temp in tunnel centre
HIERARCH ESO ISS TEMP TUN4   =        0.000 / Temp in tunnel L east
HIERARCH ESO ISS TRAK STATUS = 'NORMAL  '   / Tracking status
HIERARCH ESO OBS DID         = 'ESO-VLT-DIC.OBS-1.7' / OBS Dictionary
HIERARCH ESO OBS GRP         = '0       '   / linked blocks
HIERARCH ESO OBS ID          =    542267701 / Observation block ID
HIERARCH ESO OBS NAME        = 'SelfTest'   / OB name
HIERARCH ESO OBS OBSERVER    = 'UNKNOWN '   / Observer Name
HIERARCH ESO OBS PI-COI ID   =        52020 / ESO internal PI-COI ID
HIERARCH ESO OBS PI-COI NAME = 'UNKNOWN '   / PI-COI name
HIERARCH ESO OBS PROG ID     = '60.A-9220(A)' / ESO program identification
HIERARCH ESO OBS START       = '2002-02-26T15:39:31' / OB start time
HIERARCH ESO OBS TPLNO       =            1 / Template number within OB
HIERARCH ESO OCS DET1 IMGNAME= 'VINCI_NOISE_beam1x1' / Data File Name.
HIERARCH ESO TPL DID         = 'ESO-VLT-DIC.TPL-1.4' / Data dictionary for TPL
HIERARCH ESO TPL EXPNO       =            8 / Exposure number within template
HIERARCH ESO TPL ID          = 'VINCI_autotest_tec_lisanoise' / Template signatu
HIERARCH ESO TPL NAME        = 'VINCI LISA readout noise' / Template name
HIERARCH ESO TPL NEXP        =            8 / Number of exposures within templat
HIERARCH ESO TPL PRESEQ      = 'VINCI_tec_lisanoise.seq' / Sequencer script
HIERARCH ESO TPL START       = '2002-02-26T15:39:31' / TPL start time
HIERARCH ESO TPL VERSION     = '1.0     '   / Version of the template
END
```

5.2 IMAGING_DETECTOR (VINCI)

```
XTENSION= 'BINTABLE'           / binary table extension
BITPIX  =                    8 / 8-bit bytes
NAXIS   =                    2 / 2-dimensional binary table
NAXIS1  =                   80 / width of table in bytes
NAXIS2  =                    5 / number of rows in table
PCOUNT  =                    0 / size of special data area
GCOUNT  =                    1 / one data group (required keyword)
TFIELDS =                   11 / number of fields in each row
EXTNAME = 'IMAGING_DETECTOR'   / name of this binary table extension
INSTRUME= 'VINCI   '           / Auto Added Keyword
DATE-OBS= '        '           / Auto Added Keyword
HIERARCH ESO DET DID         = 'ESO-VLT-DIC.IRACE-1.20' / Dictionary Name
MAXTEL                       =  2 / Maximum number of telescopes contributing ph.
MAX_COEF                     =  0 / Maximum number of higher order polyn. Coef.
NDETECT                      =  1 / Number of detectors used in the instrument
NREGION                      =  5 / Number of regions used in the current mode
NUM_DIM                      =  2 / Number of dimensions in the detector array
TFORM1  = 'I       '           / data format of field: 2-byte INTEGER
TFORM10 = '8A      '           / data format of field: ASCII Character
TFORM11 = '2D      '           / data format of field: 8-byte DOUBLE
TFORM2  = 'I       '           / data format of field: 2-byte INTEGER
TFORM3  = 'I       '           / data format of field: 2-byte INTEGER
TFORM4  = 'I       '           / data format of field: 2-byte INTEGER
TFORM5  = '16A     '           / data format of field: ASCII Character
TFORM6  = '2I      '           / data format of field: 2-byte INTEGER
TFORM7  = '2I      '           / data format of field: 2-byte INTEGER
TFORM8  = '2D      '           / data format of field: 8-byte DOUBLE
TFORM9  = '2E      '           / data format of field: 4-byte REAL
TTYPE1  = 'REGION  '           / label for field   1
TTYPE10 = 'CTYPE   '           / label for field  10
TTYPE11 = 'CD      '           / label for field  11
TTYPE2  = 'DETECTOR'           / label for field   2
TTYPE3  = 'TELESCOPES'         / label for field   3
TTYPE4  = 'CORRELATION'        / label for field   4
TTYPE5  = 'REGNAME '           / label for field   5
TTYPE6  = 'CORNER  '           / label for field   6
TTYPE7  = 'NAXIS   '           / label for field   7
TTYPE8  = 'CRVAL   '           / label for field   8
TTYPE9  = 'CRPIX   '           / label for field   9
END
```

5.3 IMAGING_DETECTOR (MIDI)

```
XTENSION= 'BINTABLE'           /
BITPIX  =                    8 /
NAXIS   =                    2 /Binary table
NAXIS1  =                  338 /Number of bytes per row
NAXIS2  =                   12 /Number of rows
PCOUNT  =                    0 /Random parameter count
GCOUNT  =                    1 /Group count
TFIELDS =                   14 /Number of columns
EXTNAME = 'IMAGING_DETECTOR'   /Extension name
TTYPE1  = 'REGION  '           /
TFORM1  = '1I      '           /
TTYPE2  = 'DETECTOR'           /
TFORM2  = '1I      '           /
TTYPE3  = 'CORRELATION'        /
TFORM3  = '1I      '           /
TTYPE4  = 'REGNAME '           /
TFORM4  = '16A     '           /
TTYPE5  = 'CORNER  '           /
TFORM5  = '2J      '           /
TTYPE6  = 'GAIN    '           /
TFORM6  = '1D      '           /
TTYPE7  = 'NAXIS   '           /
TFORM7  = '2J      '           /
TTYPE8  = 'CRVAL   '           /
TFORM8  = '2D      '           /
TTYPE9  = 'CRPIX   '           /
TFORM9  = '2E      '           /
TDIM10  = '(8,2)   '           /
TTYPE10 = 'CTYPE   '           /
TFORM10 = '16A     '           /
TDIM11  = '(2,2)   '           /
TTYPE11 = 'CD      '           /
TFORM11 = '4D      '           /
TTYPE12 = 'PORTS   '           /
TFORM12 = '2I      '           /
TDIM13  = '(2,2,9) '           /
TTYPE13 = 'DMP     '           /
TFORM13 = '36I     '           /
TDIM14  = '(2,9)   '           /
TTYPE14 = 'DMC     '           /
TFORM14 = '18D     '           /
INSTRUME= 'MIDI    '           /
DATE-OBS= '        '           /
HIERARCH ESO DET DID        = 'ESO-VLT-DIC.IRACE-1.20' / Dictionary Name
MAXTEL                      =  2 / Maximum number of telescopes contributing ph.
MAX_COEF                    =  9 / Maximum number of higher order polyn. Coef.
NDETECT                     =  1 / Number of detectors used in the instrument
NREGION                     = 12 / Number of regions used in the current mode
NUM_DIM                     =  2 / Number of dimensions in the detector array
END
```

5.4 IMAGING_DETECTOR(MIDI,SIMULATED)

```
XTENSION= 'BINTABLE'           / binary table extension
BITPIX  =                    8 / 8-bit bytes
NAXIS   =                    2 / 2-dimensional binary table
NAXIS1  =                  138 / width of table in bytes
NAXIS2  =                    2 / number of rows in table
PCOUNT  =                    0 / size of special data area
GCOUNT  =                    1 / one data group (required keyword)
TFIELDS =                   14 / number of fields in each row
EXTNAME = 'IMAGING_DETECTOR'   / name of this binary table extension
TTYPE1  = 'REGION  '           / label for field   1
TFORM1  = '1I      '           / data format of field: 2-byte INTEGER
TTYPE2  = 'DETECTOR'           / label for field   2
TFORM2  = '1I      '           / data format of field: 2-byte INTEGER
TTYPE3  = 'PORTS   '           / label for field   3
TFORM3  = '2I      '           / data format of field: 2-byte INTEGER
TTYPE4  = 'CORRELATION'        / label for field   4
TFORM4  = '1I      '           / data format of field: 2-byte INTEGER
TTYPE5  = 'REGNAME '           / label for field   5
TFORM5  = '16A     '           / data format of field: ASCII Character
TTYPE6  = 'CORNER  '           / label for field   6
TFORM6  = '2I      '           / data format of field: 2-byte INTEGER
TUNIT6  = 'pixel   '           / physical unit of field
TTYPE7  = 'GAIN    '           / label for field   7
TFORM7  = '1D      '           / data format of field: 8-byte DOUBLE
TUNIT7  = 'ADU/E   '           / physical unit of field
TTYPE8  = 'NAXES   '           / label for field   8
TFORM8  = '2I      '           / data format of field: 2-byte INTEGER
TUNIT8  = 'pixel   '           / physical unit of field
TTYPE9  = 'CRVAL   '           / label for field   9
TFORM9  = '2D      '           / data format of field: 8-byte DOUBLE
TUNIT9  = 'WCS     '           / physical unit of field
TTYPE10 = 'CRPIX   '           / label for field  10
TFORM10 = '2E      '           / data format of field: 4-byte REAL
TUNIT10 = 'pixel   '           / physical unit of field
TTYPE11 = 'CTYPE   '           / label for field  11
TFORM11 = '16A     '           / data format of field: ASCII Character
TTYPE12 = 'CD      '           / label for field  12
TFORM12 = '4D      '           / data format of field: 8-byte DOUBLE
TTYPE13 = 'DMP     '           / label for field  13
TFORM13 = '4I      '           / data format of field: 2-byte INTEGER
TTYPE14 = 'DMC     '           / label for field  14
TFORM14 = '2D      '           / data format of field: 8-byte DOUBLE
DATE    = '2002-03-08T14:28:04' / file creation date (YYYY-MM-DDThh:mm:ss UTC)
REVISION=                    1 / Revision number of the table definition, no
NDETECT =                    1 / The number of detectors used in the instrument
NREGION =                    2 / The number of regions used in the current mode
MAX_COEF=                    1 / The maximum number of higher order polynomial c
NUM_DIM =                    2 / The number of dimensions in the detector array
INSTRUME= 'simulator'          / The name of the instrument (e.g. 'midi')
MAXTEL  =                    2 / The maximum number of telescopes contributing p
DATE-OBS= 'unknown '           / Start date/time of observations described by th
OTHERS  =       (0.5, 3.1415) / Other keywords that are instrument specific, e.
TDIM11  = '(8,2)   '           / Column dimensionality
TDIM12  = '(2,2)   '           / Column dimensionality
TDIM13  = '(2,2,1) '           / Column dimensionality
TDIM14  = '(2,1)   '           / Column dimensionality
END
```

5.5 IMAGING_DATA(MIDI)

```
XTENSION= 'BINTABLE'           / binary table extension
BITPIX  =                    8 / 8-bit bytes
NAXIS   =                    2 / 2-dimensional binary table
NAXIS1  =                   64 / width of table in bytes
NAXIS2  =                 2048 / number of rows in table
PCOUNT  =                    0 / size of special data area
GCOUNT  =                    1 / one data group (required keyword)
TFIELDS =                   16 / number of fields in each row
EXTNAME = 'IMAGING_DATA'       / name of this binary table extension
TTYPE1  = 'FRAME   '           / label for field   1
TFORM1  = '1J      '           / data format of field: 4-byte INTEGER
TTYPE2  = 'TIME    '           / label for field   2
TFORM2  = '1D      '           / data format of field: 8-byte DOUBLE
TUNIT2  = 'DAY     '           / physical unit of field
TTYPE3  = 'EXP_TIME'           / label for field   3
TFORM3  = '1E      '           / data format of field: 4-byte REAL
TUNIT3  = 'SECOND  '           / physical unit of field
TTYPE4  = 'OPT_TRAIN'          / label for field   4
TFORM4  = '2I      '           / data format of field: 2-byte INTEGER
TTYPE5  = 'REFERENCE'          / label for field   5
TFORM5  = '1I      '           / data format of field: 2-byte INTEGER
TTYPE6  = 'OPD     '           / label for field   6
TFORM6  = '1D      '           / data format of field: 8-byte DOUBLE
TUNIT6  = 'SECOND  '           / physical unit of field
TTYPE7  = 'LOCALOPD'           / label for field   7
TFORM7  = '1D      '           / data format of field: 8-byte DOUBLE
TUNIT7  = 'SECOND  '           / physical unit of field
TTYPE8  = 'OFFSET  '           / label for field   8
TFORM8  = '2E      '           / data format of field: 4-byte REAL
TUNIT8  = 'DEGREE  '           / physical unit of field
TTYPE9  = 'ROTATION'           / label for field   9
TFORM9  = '1E      '           / data format of field: 4-byte REAL
TUNIT9  = 'DEGREE  '           / physical unit of field
TTYPE10 = 'STEPPING_PHASE'     / label for field  10
TFORM10 = '1I      '           / data format of field: 2-byte INTEGER
TTYPE11 = 'DATA1   '           / label for field  11
TFORM11 = '1I      '           / data format of field: 2-byte INTEGER
TUNIT11 = 'ADU     '           / physical unit of field
TTYPE12 = 'SOURCE1 '           / label for field  12
TFORM12 = '1I      '           / data format of field: 2-byte INTEGER
TTYPE13 = 'TARTYP1 '           / label for field  13
TFORM13 = '1I      '           / data format of field: 2-byte INTEGER
TTYPE14 = 'DATA2   '           / label for field  14
TFORM14 = '1I      '           / data format of field: 2-byte INTEGER
TUNIT14 = 'ADU     '           / physical unit of field
TTYPE15 = 'SOURCE2 '           / label for field  15
TFORM15 = '1I      '           / data format of field: 2-byte INTEGER
TTYPE16 = 'TARTYP2 '           / label for field  16
TFORM16 = '1I      '           / data format of field: 2-byte INTEGER
DATE    = '2002-03-08T14:28:04' / file creation date (YYYY-MM-DDThh:mm:ss UTC)
HIERARCH ESO DET DID         = 'ESO-VLT-DIC.IRACE-1.20' / Dictionary Name
MAXTEL                       =  2 / Maximum number of telescopes contributing ph.
MAXSTEP                      =  64 / Maximum number of steps (STEPPING_PHASE)
NREGION                      =  2 / Number of regions used in the current mode
DATE-OBS= 'unknown '           / Start date of observations 'yyyy-mm-dd(Thh:mm:s
TDIM11  = '(1,1)   '           / Column dimensionality
TDIM14  = '(1,1)   '           / Column dimensionality
END
```

5.6 IMAGING_DATA (VINCI)

```
XTENSION= 'BINTABLE'           / binary table extension
BITPIX  =                    8 / 8-bit bytes
NAXIS   =                    2 / 2-dimensional binary table
NAXIS1  =                   20 / width of table in bytes
NAXIS2  =                28600 / number of rows in table
PCOUNT  =                    0 / size of special data area
GCOUNT  =                    1 / one data group (required keyword)
TFIELDS =                    6 / number of fields in each row
EXTNAME = 'IMAGING_DATA'       / name of this binary table extension
DATE-OBS= '        '           / Auto Added Keyword
HIERARCH ESO DET DID         = 'ESO-VLT-DIC.IRACE-1.20' / Dictionary Name
MAXTEL                       =  2 / Maximum number of telescopes contributing ph.
MAXSTEP                      =  572 / Max. number of steps  (DICB, ESO.DET.RM.NFRAM)
NREGION                      =  5 / Number of regions used in the current mode
TFORM1  = 'D       '           / data format of field: 8-byte DOUBLE
TFORM2  = 'I       '           / data format of field: 2-byte INTEGER
TFORM3  = 'I       '           / data format of field: 2-byte INTEGER
TFORM4  = 'I       '           / data format of field: 2-byte INTEGER
TFORM5  = 'I       '           / data format of field: 2-byte INTEGER
TFORM6  = 'E       '           / data format of field: 4-byte REAL
TTYPE1  = 'TIME    '           / label for field   1
TTYPE2  = 'DATA1   '           / label for field   2
TTYPE3  = 'DATA2   '           / label for field   3
TTYPE4  = 'DATA3   '           / label for field   4
TTYPE5  = 'DATA4   '           / label for field   5
TTYPE6  = 'DATA5   '           / label for field   6
END
```

5.7 SCAN_DATA (VINCI)

```
XTENSION= 'BINTABLE'             / binary table extension
BITPIX  =                      8 / 8-bit bytes
NAXIS   =                      2 / 2-dimensional binary table
NAXIS1  =                     34 / width of table in bytes
NAXIS2  =                     50 / number of rows in table
PCOUNT  =                      0 / size of special data area
GCOUNT  =                      1 / one data group (required keyword)
TFIELDS =                      5 / number of fields in each row
EXTNAME = 'SCAN_DATA'            / name of this binary table extension
HIERARCH ESO DET DID         = 'ESO-VLT-DIC.IRACE-1.20' / Dictionary Name
NREGION                      =  5 / Number of regions used in the current mode
TFORM1  = 'D       '             / data format of field: 8-byte DOUBLE
TFORM2  = 'I       '             / data format of field: 2-byte INTEGER
TFORM3  = 'D       '             / data format of field: 8-byte DOUBLE
TFORM4  = 'D       '             / data format of field: 8-byte DOUBLE
TFORM5  = 'D       '             / data format of field: 8-byte DOUBLE
TTYPE1  = 'TIME    '             / label for field   1
TTYPE2  = 'FRINGE  '             / label for field   2
TTYPE3  = 'DLOFFS  '             / label for field   3
TTYPE4  = 'SNRPA   '             / label for field   4
TTYPE5  = 'SNRPB   '             / label for field   5
END
```

5.8 ARRAY_GEOMETRY

```
XTENSION= 'BINTABLE'           / binary table extension
BITPIX  =                    8 / 8-bit bytes
NAXIS   =                    2 / 2-dimensional binary table
NAXIS1  =                   38 / width of table in bytes
NAXIS2  =                    3 / number of rows in table
PCOUNT  =                    0 / size of special data area
GCOUNT  =                    1 / one data group (required keyword)
TFIELDS =                    6 / number of fields in each row
EXTNAME = 'ARRAY_GEOMETRY'     / name of this binary table extension
HIERARCH ESO ISS DID        = 'ESO-VLT-DIC.ISS' / Data dictionary name
HIERARCH ESO ISS ID         = 'VINCI/1.54  '   / ISS version string
ARRAYX                      =  -5.48E+06 / X coord. of the array center in the frame
ARRAYY                      =  1.952E+06 / Y coord. of the array center in the frame
ARRAYZ                      =  -2.66E+06 / Z coord. of the array center in the frame
ARRNAME                     = 'VLTI    '   / Name of the array
FRAME                       = 'GEOCENTRIC' / Coordinate frame
DATE-OBS= '2002-02-26T15:40:04.3' / Auto Added Keyword
TFORM1  = '4A      '           / data format of field: ASCII Character
TFORM2  = '2A      '           / data format of field: ASCII Character
TFORM3  = 'I       '           / data format of field: 2-byte INTEGER
TFORM4  = 'E       '           / data format of field: 4-byte REAL
TFORM5  = '3D      '           / data format of field: 8-byte DOUBLE
TFORM6  = 'I       '           / data format of field: 2-byte INTEGER
TTYPE1  = 'TEL_NAME'           / label for field   1
TTYPE2  = 'STA_NAME'           / label for field   2
TTYPE3  = 'INDEX   '           / label for field   3
TTYPE4  = 'DIAMETER'           / label for field   4
TTYPE5  = 'STAXYZ  '           / label for field   5
TTYPE6  = 'MNTSTA  '           / label for field   6
TUNIT4  = 'm       '           / physical unit of field
TUNIT5  = 'm       '           / physical unit of field
END
```

5.9 ARRAY_CONFIGURATION

```
XTENSION= 'BINTABLE'           / binary table extension
BITPIX  =                    8 / 8-bit bytes
NAXIS   =                    2 / 2-dimensional binary table
NAXIS1  =                   26 / width of table in bytes
NAXIS2  =                    3 / number of rows in table
PCOUNT  =                    0 / size of special data area
GCOUNT  =                    1 / one data group (required keyword)
TFIELDS =                   13 / number of fields in each row
EXTNAME = 'OPTICAL_TRAIN'      / name of this binary table extension
HIERARCH ESO ISS DID        = 'ESO-VLT-DIC.ISS' / Data dictionary name
HIERARCH ESO ISS ID         = 'VINCI/1.54  '   / ISS version string
ARRNAME                     = 'VLTI    '   /
DATE-OBS= '2002-02-26T15:40:04.3' /
TFORM1  = 'I       '           / data format of field: 2-byte INTEGER
TFORM10 = 'I       '           / data format of field: 2-byte INTEGER
TFORM11 = 'I       '           / data format of field: 2-byte INTEGER
TFORM12 = 'I       '           / data format of field: 2-byte INTEGER
TFORM13 = 'I       '           / data format of field: 2-byte INTEGER
TFORM2  = 'I       '           / data format of field: 2-byte INTEGER
TFORM3  = 'I       '           / data format of field: 2-byte INTEGER
TFORM4  = 'I       '           / data format of field: 2-byte INTEGER
TFORM5  = 'I       '           / data format of field: 2-byte INTEGER
TFORM6  = 'I       '           / data format of field: 2-byte INTEGER
TFORM7  = 'I       '           / data format of field: 2-byte INTEGER
TFORM8  = 'I       '           / data format of field: 2-byte INTEGER
TFORM9  = 'I       '           / data format of field: 2-byte INTEGER
TTYPE1  = 'INDEX   '           / label for field   1
TTYPE10 = 'FEED_FSU'           / label for field  10
TTYPE11 = 'FEED_PRIMA_A'       / label for field  11
TTYPE12 = 'FEED_PRIMA_B'       / label for field  12
TTYPE13 = 'FEED_AMBER'         / label for field  13
TTYPE2  = 'TELESCOPE'          / label for field   2
TTYPE3  = 'DLY_LINE'           / label for field   3
TTYPE4  = 'LAB_INPUT1'         / label for field   4
TTYPE5  = 'SWYARD1 '           / label for field   5
TTYPE6  = 'LAB_INPUT2'         / label for field   6
TTYPE7  = 'SWYARD2 '           / label for field   7
TTYPE8  = 'FEED_MIDI'          / label for field   8
TTYPE9  = 'FEED_VINCI'         / label for field   9
END
```

5.10 DICB DICTIONARY: ARRAY_GEOMETRY

```
A#*************************************************************************
*
# E.S.O. - VLT project
#
# "@(#) $Id: ESO-VLT-DIC.VNCI_ICS,v 1.2 2001/11/26 12:52:22 csabet Exp $"
#
# who       when       what
# --------  ---------- ----------------------------------------------
# awalland  04/02/1999 created
#
# Keywords for ARRAY_GEOMETRY extension
#

Dictionary Name:   ESO-VLT-DIC.ISS_AG
Scope:             ISS
Source:            ESO VLT
Version Control:   $Id: ESO-VLT-DIC.ISS_AG,v 1.2 2001/11/26 12:52:22 csa Exp$
Revision:          $Revision: 1.2 $
Date:              2001-02-16
Status:            Development
Description:       Based on GEN-SPE-ESO-19400-794, 1.1

Parameter Name:    ISS ID
Class:             conf-log|header
Context:           Instrument
Type:              string
Value Format:      %30s
Unit:
Comment Format:    ISS Software Version String
Description:       Combines the ESO identification of the instrument
                   and the software version of the control software.
                   Format: NAME/HW-REV/SW-VERSION

Parameter Name:    ISS DID
Class:             header
Context:           Instrument
Type:              string
Value Format:      %30s
Unit:
Comment Format:    Data dictionary for ISS
Description:       Name and version of ESO DID to which ISS keywords
                   comply to.

Parameter Name:    EXTNAME
Class:             header
Context:           Instrument
Type:              string
Value Format:      %32s
Unit:
Comment Format:    Extension name
Description:       Name of the binary table extension.

Parameter Name:    ORIGIN
Class:             header
```

```
Context:            Instrument
Type:               string
Value Format:       %30s
Unit:
Comment Format:     Origin of file
Description:        Identification of the observatory where the file has
                    been created, e.g. ESO-PARANAL

Parameter Name:     TELESCOP
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      ESO Telescope Name
Description

Parameter Name:     DATE
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      HDU Creation Date
Description

Parameter Name:     ARRNAME
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      Array name
Description

Parameter Name:     FRAME
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      Coordinate frame
Description

Parameter Name:     ARRAYX
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:               m
Comment Field:      X Coordinate of the array in the coordinate frame
Description


Parameter Name:     ARRAYY
Class:              header
Context:            FITS
```

```
Type:               string
Value Format:       %20s
Unit:               m
Comment Field:      Y Coordinate of the array in the coordinate frame
Description

Parameter Name:     ARRAYZ
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:               m
Comment Field:      Z Coordinate of the array in the coordinate frame
Description

Parameter Name:     TFIELDS
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      Number of fields in each row
Description

Parameter Name:     TFORMi
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      Data format of field
Description

Parameter Name:     TTYPEi
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      Field label
Description

Parameter Name:     TUNITi
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
Unit:
Comment Field:      Physical unit of field
Description


Parameter Name:     TDIMi
Class:              header
Context:            FITS
Type:               string
Value Format:       %20s
```

```
Unit:
Comment Field:     Column dimensionality
Description
```