Data eXchange Unit Description

IWG4 WP2 (Geometric and observed SF) DXU Description

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1 Objectives

This document defines the Data eXchange Unit (DXU) for the IWG4 WP2 data product to be used by 4OR. IWG4 WP2 is responsible for calculating the geometric and observed selection functions for 4MOST surveys. These selection functions are calculated for real observed targets, whenever necessary the input from object selection functions ([RD8]) is used. The data products of IWG4 WP1 (object selection functions) are defined in [RD8].

Any changes to the DXU must be agreed upon by the IWG4 and DMS including the 4OR in advance of data product submission to allow all parties to update their software to accommodate any agreed changes.

2 Applicable Documents (AD)

The following applicable documents (AD) of the exact issue shown form a part of this document to the extent described herein. In the event of conflict between the documents referenced herein and the contents of this document, the contents of this document are the superseding requirement.

AD ID	Document Title	Document Number	Issue	Date

AD ID	Document Title	Document Number	Issue	Date
[AD1]	4MOST ICD – General Definitions	MST-ICD-PMO-02000-0002	1.a	2014-07-21
[AD2]	4MOST Acronym List	MST-LIS-PMO-30500-9350-0001	2.00	2015-03-06
[AD3]	VLT Software Programming Standards	VLT-PRO-ESO-10000-0228	2.00	11.02.2010
[AD4]	Software Engineering Development Standard	MST-STD-PMO-40200-9420-0001	1.00	06.04.2016
[AD5]	FITS Working Group, Commission 5: Documentation and Astronomical Data, International Astronomical Union. Definition of the Flexible Image Transport System (FITS),	http://fits.gsf .nasa.gov/fits_standard.html	3.0	07-2008
[AD6]	ESO Science Data Products Standard	GEN-SPE-ESO-33000-5335	5.0	11/01/2013
[AD7]	MOC - HEALPix Multi-Order Coverage map	http://www.ivoa.net/ documents/MOC/index.html	1.0	02/06/2014
[AD8]	MANGLE mask description	http://space.mit.edu/~molly/mangle		
[AD9]	The HEALPIX Primer	http://healpix.sourceforge.net/ documentation.php	3.31	06/01/2017

3 Reference Documents (RD)

The following reference documents (RD) contain useful information relevant to the subject of the present document.

RD ID	Document Title	Document Number	Issue	Date
[RD1]	Data Interface Control Document (ESO FITS Header standards)	GEN-SPE-ESO-19400-0794	5.0	8/07/2011
[RD2]	DMS DRPD	VIS-DER-4MOST-47110-1410-0002	1.0	2017-02-27
[RD3]	DMS DR Archive	VIS-DER-4MOST-47110-1440-0001	1.1	2016-11-15
[RD4]	Back-End ICD	VIS-ICD-4MOST-47110-9700-0002	1.0	2017-02-27

RD ID	Document Title	Document Number	Issue	Date
[RD5]	The UCD1+ controlled vocabulary Version 1.3	http://wiki.ivoa.net/internal/IVOA/PlanetaryUCD/WD-UCDlist-1.3-20170502.pdf	1.3	2017-05-02
[RD6]	IWG4 WP1 (OSF) description	MST-TNO-PSC-20304-9234-0002	1.0	01/03/2017
[RD7]	IWG4 WP2 (GSF) description	MST-TNO-PSC-20304-9234-0003	1.0	01/03/2017
[RD8]	IWG4 WP1 (OSF) DXU description		0.05	05/12/2017

4 Definitions

The L1 products are the extracted and reduced science-ready spectra upon which L2 (and L3) analyses will take place, as described in [RD2]. The L2 products are the deliverables from the L2 pipelines that are measured on the L1 products. The L1 and L2 products comprise the Phase 3 requirements for ESO.

The L3 products are added value products that are supplementary to the L2 products but are not included within the ESO Phase 3 product delivery.

4OR is the operational repository for 4MOST that will hold all 4MOST products ingested on a continuous basis as described in [RD3].

4PA is the public archive for 4MOST that will hold L1 and L2 products for release to the 4MOST community and the world on a regular basis as described in [RD3].

The data flow of the entire back end operations is described in [RD4].

The description of the selection functions (SFs) is described in [RD6] and [RD7]. The current DXU defines the data structure for geometric and observational selection functions described in [RD7].

HEALPix is a Hierarchical, Equal Area, and iso-Latitude Pixelation of the sphere described in [AD9]. Multi-Order Coverage map method (MOC) to specify arbitrary sky regions is described in [AD7]. The mechanism is based on the HEALPix sky tessellation algorithm ([AD9]).

Mangle is a suite of free open-source software designed to deal accurately and efficiently with complex angular masks, such as typically occur in galaxy surveys. Mangle mask definition is described in [AD8].

5 General Format

FITS format is the designated format for data transport for 4MOST. Standard notation and naming conventions for the files and content are provided at the start of the pertinent sections below.
There are four key standards that all DXUs must adhere to:

- The use of FITS must adhere to the ESO FITS standards outlined in [RD1],
- The data and metadata described here must meet the requirements for ingestion into the 4MOST archives as described in [RD3] section 4.3.2.2,
- The data and metadata must be VO compliant. Unified Content Descriptors[1] must be specified per measurable as listed in [RD5].
- For the purposes of delivery as ESO Phase 3 these products must also adhere to the ESO Science Data Product Standards as described in [AD6].

5.1 Data Package Delivery to 4OR

The data products will be delivered to the 4OR via secure ftp upload as described in [RD3] section 4.3.2.2.

6 FITS File and Structure

The data package is the output of the analysis by IWG4 on the L1 and L2 data products. The provenance of the input products (input product filename and version number) is retained in the data products by IWG4 in the Primary Header.

6.1 FITS Filename

The filename of each delivered product should have the format defined below where the naming fields are separated by an underscore:

FM_<Field1>_<Field2>_<Field3>.fits

The fields are defined in **Table 6-1**.

Table 6-1 Filename Fields

Field	Description	Example
FM	Code-usable abbreviation for 4MOST	
1	Data Release abbreviation and number to 2.d.p	DR1.00
2	Source of FITS file	IWG4
3	Survey and sub-survey abbreviation	S6.1

The length of the FITS filename should not be excessive (≤30) and 3 fields should be sufficient to distinguish files for a particular data release. Further file specific information should be placed in the primary header (see Section 6.4).

Selection functions are calculated per sub-survey. Since SFs data products are different for each survey, there are separate file for each sub-survey. The structure of FITS file for each sub-survey is described in Section 6.2.

[1] http://www.ivoa.net/documents/REC/UCD/UCD-20050812.html

The list of all sub-surveys is defined in Table 6-2.

Table 6-2 List of surveys and sub-surveys

Abbreviation	Survey name	Sub-survey name
S1.1	MW Halo LR Survey	k/m giants
S1.2	MW Halo LR Survey	Rare objects
S2.1	MW Halo HR Survey	Bright
S2.2	MW Halo HR Survey	Faint
S3.1	MW Bulge and Disc LR Survey	Extended Solar neighborhood
S3.2	MW Bulge and Disc LR Survey	Dynamical disc
S3.3	MW Bulge and Disc LR Survey	Faint dynamical disc
S3.4	MW Bulge and Disc LR Survey	Chemodynamical disc
S3.5	MW Bulge and Disc LR Survey	Inner Galaxy
S3.6	MW Bulge and Disc LR Survey	White dwarfs
S3.7	MW Bulge and Disc LR Survey	Compact X-ray emitting binaries
S4.1	MW Bulge and Disc HR Survey	Bulge
S4.2	MW Bulge and Disc HR Survey	Inner disc
S4.3	MW Bulge and Disc HR Survey	Outer disc
S4.4	MW Bulge and Disc HR Survey	Nearby disc
S5.1	Galaxy Cluster Survey	Bright cluster galaxies
S5.2	Galaxy Cluster Survey	Cluster members
S5.3	Galaxy Cluster Survey	High SNR cluster members
S6.1	AGN Survey	Main AGN survey
S6.2	AGN Survey	High-resolution AGN survey
S7.1	Galaxy Evolution Survey (WAVES)	WAVES-Wide
S7.2	Galaxy Evolution Survey (WAVES)	WAVES-Deep
S8.1	Cosmology Redshift Survey	WiFloZ: Bright galaxies (BG) sub-survey
S8.2	Cosmology Redshift Survey	BLESS-Red: LRG sub-survey
S8.3	Cosmology Redshift Survey	BLESS-Blue: ELG sub-survey
S8.4	Cosmology Redshift Survey	QURVE: Quasar sub-survey
S8.5	Cosmology Redshift Survey	QURVE-LyA: Lyman alpha forest sub-survey
S9.1	Magellanic Clouds Survey	Main sequence stars
S9.2	Magellanic Clouds Survey	RR Lyrae stars
S9.3	Magellanic Clouds Survey	Cepheids low-resolution
S9.4	Magellanic Clouds Survey	Red clumps stars
S9.5	Magellanic Clouds Survey	RGB stars
S9.6	Magellanic Clouds Survey	Supergiant stars
S9.7	Magellanic Clouds Survey	Cepheids high-resolution

S9.8	Magellanic Clouds Survey	O-rich AGB stars
S9.9	Magellanic Clouds Survey	C-rich AGB stars
S9.10	Magellanic Clouds Survey	Tip of RGB stars
S9.11	Magellanic Clouds Survey	Others
S10.1	Time-Domain Extragalactic Survey	TiDES-SH: supernovae hosts
S10.2	Time-Domain Extragalactic Survey	TiDES-LT: live transients
S10.3	Time-Domain Extragalactic Survey	TiDES-RM: AGN reverberation mapping

6.2 FITS Structure

The structure of the IWG4 geometric and observational SF data products is defined in **Table 6-3**. The types of data delivered are 2D Binary Tables. Each data product (each sub-survey) have extensions that are common for all sub-surveys. In addition to the common extensions, there are extensions defined specifically for some surveys and sub-surveys. The list of these additional extensions is defined in Section 6.2.1.

Table 6-3 FITS Structure (common to all sub-surveys)

EXTN #	Extension Name	Description
0	PHU	This is the primary header unit. There will be no data in this HDU. The header will have all the general information about the IWG4 data product.
1	MOC_map	Multi-Order Coverage map. This defines the survey footprint on the sky using HEALPix pixelisation.
2	GSF_HEALPix	This is the Geometric Selection Function in HEALPix format. This gives the completeness information and achieved/limiting signal to noise ratio (SNR) for each HEALPix pixel. Limiting SNR is defined for a 'standard' object in a fixed filter (TBD).
3	TARGETS	This gives the SFs per object. For each object, we assign a probability that it got targeted and successfully observed by 4MOST.
4	SNR_TABLE	This extension gives correspondence between limiting SNR value (given in extension GSF_HEALPix) and physical quantities: i.e. limiting object magnitude.
5, …	See Section 6.2.1	Additional extensions for each survey and sub-survey are defined in Section 6.2.1.

Note: In addition to the MOC map and completeness function in HEALPix format, the SFs are calculated in MANGLE format. It is currently TBD how the SFs in MANGLE format are stored in the archive. It is also unclear whether SFs in MANGLE format are produced for all surveys. Once this is decided, we will update the FITS Structure given in Table 6-3.
Note 2: For each pixel we calculate the maximum depth of summed observations, while taking account the throughput variation from fibre to fibre, weather conditions, allocated exposure times, etc. Currently, this is given as SNR for some 'standard' object in a fixed band. Final decision how this is given is TBD.
Note 3: The extensions listed above describe the SFs introduced by 4MOST survey. For complete selection functions this should be combined with the selection of input target

catalogues. It is TBD, how and where the initial selection by surveys should be described. Most likely this is described in surveys DXU document.
Note 4: "Successfully observed" should be specified. Success should be defined by the surveys.

6.2.1 Specific extensions for surveys and sub-surveys

Additional extensions for surveys and sub-surveys are defined in tables below. Table header gives a list of applicable sub-surveys. The list of additional extensions is not complete and it will be updated during the survey preparation.
Note: In addition to the 1D completeness distributions (completeness as a function of object parameter), we will also calculate the 2D completeness as a function of object parameter and SNR. For some surveys, we will also produce multi-dimensional completeness maps, where several object parameters are combined. The final list of multi-dimensional completeness maps will be defined in collaboration with surveys. At the moment it is TBD.

Table 6-4 FITS Structure. Additional extensions for: S1.x

EXTN #	Extension Name	Description
5	OBSSF_parallax	This gives the marginal completeness as a function of parallax.
6	OBSSF_proper_motion	This gives the marginal completeness as a function of proper motion
7	OBSSF_mag_x	This gives the marginal completeness as a function of magnitude in band X. Selection of magnitude(s) is TBD.
8	OBSSF_temp_eff	This gives the marginal completeness as a function of effective temperature
9	OBSSF_gravity	This gives the marginal completeness as a function of surface gravity
10	OBSSF_metallicity	This gives the marginal completeness as a function of metallicity

Table 6-5 FITS Structure. Additional extensions for: S3.x

EXTN #	Extension Name	Description
5	OBSSF_parallax	This gives the marginal completeness as a function of parallax.
6	OBSSF_proper_motion	This gives the marginal completeness as a function of proper motion
7	OBSSF_mag_x	This gives the marginal completeness as a function of magnitude in band X. Selection of magnitude(s) is TBD.
8	OBSSF_abundance_He	This gives the marginal completeness as a function of element abundance: He
9	OBSSF_abundance_Li	This gives the marginal completeness as a function of element abundance: Li
10	OBSSF_abundance_C	This gives the marginal completeness as a function of element abundance: C

11	OBSSF_abundance_Na	This gives the marginal completeness as a function of element abundance: Na
12	OBSSF_abundance_Mg	This gives the marginal completeness as a function of element abundance: Mg
13	OBSSF_abundance_Ca	This gives the marginal completeness as a function of element abundance: Ca
14	OBSSF_abundance_Ti	This gives the marginal completeness as a function of element abundance: Ti
15	OBSSF_abundance_Cr	This gives the marginal completeness as a function of element abundance: Cr
16	OBSSF_abundance_Fe	This gives the marginal completeness as a function of element abundance: Fe
17	OBSSF_abundance_Sr	This gives the marginal completeness as a function of element abundance: Sr
18	OBSSF_abundance_Ba	This gives the marginal completeness as a function of element abundance: Ba
19	OBSSF_temp_eff	This gives the marginal completeness as a function of effective temperature
20	OBSSF_gravity	This gives the marginal completeness as a function of surface gravity
21	OBSSF_metallicity	This gives the marginal completeness as a function of metallicity

Table 6-6 FITS Structure. Additional extensions for: S5.2

EXTN #	Extension Name	Description
5	CLUSTERS	This gives the number and fraction of galaxies successfully observed in a given cluster.

Table 6-7 FITS Structure. Additional extensions for: S6.x

EXTN #	Extension Name	Description
5	OBSSF_mag_x	This gives the marginal completeness as a function of magnitude in band X. Magnitude is TBD.
6	OBSSF_redshift	This gives the marginal completeness as a function of redshift.
7	OBSSF_AGN_type	This gives the marginal completeness as a function of AGN type.

Table 6-8 FITS Structure. Additional extensions for: S7.x

EXTN #	Extension Name	Description
5	OBSSF_mag_x	This gives the marginal completeness as a function of magnitude in band X. Magnitude is TBD.

6	OBSSF_size	This gives the marginal completeness as a function of galaxy size.
7	OBSSF_surface_brightness	This gives the marginal completeness as a function of surface brightness.
8	OBSSF_color_x	This gives the marginal completeness as a function of color index X. Color index is TBD.
9	OBSSF_em_line	This gives the marginal completeness as a function of emission line strength.
11, …	…	Multi-dimensional completeness maps. Success as a joint function of object properties and SNR.

Remark: the number of parameters and the exact meaning of these parameters are specified by survey. Currently, these are just placeholders.

6.3 Specific Usage Conventions for 4MOST DXUs

The following conventions are used across the 4MOST DXUs for consistency and standardisation when being ingested by the archives.

6.3.1 NULL Values

For NULL values the standard usage per data type are listed in Table 6-9.

Table 6-9 NULL Values per Data Type

Column Type	Data Type	NULL Value
AlphaNumeric (e.g. Object name, Flags)	String	‘’
Measurements, Errors	Floating Point	NaN, INDEF, NULL
Limits, Number Counts	Integer (positive)	-1

6.3.2 Concatenation symbol

When multiple strings are concatenated within a string cell (e.g. multiple flags, names etc) the delimiter for use in this DXU is the pipe symbol ‘|’. Currently, we do not see any need for delimiter, however, it might change in the future when DXU document is updated.

6.3.3 Coordinate Units and Precision

The coordinate columns used in this DXU are in units of degree decimals and specified in DOUBLE precision. The used coordinate system for RA and Dec is J2000 equatorial. Coordinates are given in GAIA reference system.

6.3.4 Boolean values

Use of any Booleans in this DXU adhere to the correct usage within FITS file of ‘T’ and ‘F’.

6.4 Primary Header

The primary header contains further information regarding the source and processing of the data products that is not encoded in the filename.
Keywords added to the standard FITS primary header are listed in **Table 6-10**.

Table 6-10 Primary Header Keywords		
Keyword	**Content**	**Description**
FMNODE	IWG4	4MOST node that has produced this data product
RELEASE	DRX.xx	Data release of this data product
PVERS	XX.xx	IWG4 WP2 Pipeline Version
DXUDOC	<SOURCE DXU Document name>	Data eXchange Unit document in which this product is described.
CONTACT	<name of person>	Who to contact if any anomalies are found in this dataproduct.
FMSURVEY	<e.g. AGN survey>	Name of the survey
FMSUBSUR	<e.g. main survey>	Name of the sub-survey

6.5 FITS Extensions

Each of the Extensions listed in **Table 6-3** and in Section 6.2.1 (Table 6-4 – Table 6-8) are described further in the following subsections.

6.5.1 Extension 1: Multi-Order Coverage map

Extension 1 contains the footprint of the sub-survey on the sky in Multi-Order Coverage map format. This is output from the IWG4 GSF analysis pipeline.
This map convolves the footprint of the survey input catalogue with the footprint of 4MOST observations. The completeness information in observed footprint is provided in Extension 2.

Table 6-11 Extension 1 Header Keywords		
Keyword	**Content**	**Description**
EXTNAME	MOC_map	Name of extension
PIXTYPE	HEALPIX	HEALPix magic code
ORDERING	NUNIQ	NUNIQ coding method
COORDSYS	C	ICRS reference frame
MOCORDER	<best resolution of the MOC file>	MOC resolution (best order)
MOCTOOL	<name of the MOC generator software>	Name of the MOC generator software
MOCTVERS	<version of the MOC generator tool>	Version number of MOC generator software

The columns provided in the MOC map are listed in Table 6-16.

6.5.2 Extension 2: HEALPix Geometric Selection Functions

The selection functions calculated by IWG4 are given in Extension 2. **Table 6-12** lists header keywords and Table 6-15 defines the columns in this table. The columns reflect the information needed to construct the FITS binary table, where TTYPE is the name of the column, TFORM is the data format of the column, TUNIT is the associated unit, TNULL is the value defined as NULL in the binary structure, TDISP[2] is the display precision for the

[2] https://heasarc.gsfc.nasa.gov/ftools/fv/doc/displayFormat.html

measurement, TDMIN is the minimum expected value for the measurement if numeric, TDMAX is the maximum expected value for the measurement if numeric, and TUCD is the Unified Content Descriptor for the measurement taken from [RD5].

Table 6-12 Extension 2 Header Keywords

Keyword	Content	Description
EXTNAME	GSF_HEALPix	Name of extension
PIXTYPE	HEALPIX	HEALPix magic code
ORDERING	NESTED	HEALPix ordering scheme
ORDER	<HEALPix order>	HEALPix order

6.5.3 Extension 3: TARGETS

Extension 3 contains the completeness and selection function information per target. The columns provided in the MOC map are listed in Table 6-18. This table includes all targets (for a given sub-survey) from 4MOST input catalogue.

Table 6-13 Extension 3 Header Keywords

Keyword	Content	Description
EXTNAME	TARGETS	Name of extension

6.5.4 Extension 4: SNR_TABLE

Extension 4 contains the information how limiting SNR is related with some physical quantities.

Table 6-14 Extension 4 Header Keywords

Keyword	Content	Description
EXTNAME	SNR_TABLE	Name of extension

6.5.5 Extension: …

The content of additional extensions (specific to sub-surveys) defined in Section 6.2.1 is TBD.

Table 6-16 MOC map binary table

TTYPE	TTYPE comment	TFORM	TFORM comment	TUNIT	TUNIT comment	TNULL	Data Range	TDISP	TDMIN	TDMAX	TUCD
UNIQ	MOC map UNIQ value	K	data format of field: 64-bit integer	none	none	empty string	Positive-integer	I19	1	inf	pos.healpix

Table 6-15 GSF HEALPix binary table

TTYPE	TTYPE comment	TFORM	TFORM comment	TUNIT	TUNIT comment	TNULL	Data Range	TDISP	TDMIN	TDMAX	TUCD
NPIX	HEALPix cell index	J	data format of field: 32-bit integer	none	none	empty string	Positive-integer	I10	1	inf	pos.healpix
P_TAR	Mean probability that object was targeted (observed) my 4MOST in a given pixel	E	data format of field: 4-byte real	none	none	NULL	Positive-real	F6.4	0.0	1.0	stat.probability
P_SUC	Mean success rate of measuring object parameters in a given pixel	E	data format of field: 4-byte real	none	none	NULL	Positive-real	F6.4	0.0	1.0	stat.probability
SNR_LIM	Limiting signal to noise ratio for a ‘standard’ object (in fixed band) in a given pixel	E	data format of field: 4-byte real	bobe	none	NULL	Positive-real	F8.2	0.0	Inf	stat.snr

Table 6-18 TARGETS binary table

TTYPE	TTYPE comment	TFORM	TFORM comment	TUNIT	TUNIT comment	TNULL	Data Range	TDISP	TDMIN	TDMAX	TUCD
CNAME	4MOST object name from coordinates	A	data format of field: ASCII Character	none	none	empty string	Alpha-numeric	A16	none	none	meta.id
RA	Catalogue RA of object in decimal degrees	D	data format of field: 8-byte DOUBLE	Degree decimal	Physical unit	NULL	Positive-real	D9.2	0	360	Pos.eq.ra
DEC	Catalogue Declination of object in decimal degrees	D	data format of field: 8-byte DOUBLE	Degree decimal	Physical unit	NULL	Real	D9.1	-90	90	Pos.eq.dec
OBSERVED	Logical value whether object is observed by 4MOST	L	data format of field: 1-byte logical	none	none	NULL	T or F	L1	none	none	Meta.code
PROB_TAR	Probability that object was targeted/observed by 4MOST	E	data format of field: 4-byte real	None	Probability	NULL	Positive-real	F6.4	0	1	stat.probability
SNR	Signal to noise ratio of an object in a fixed band	E	data format of field: 4-byte real	none	none	NULL	Positive-real	F8.2	0	Inf	Stat.snr
PROB_SUC	Success rate that objects parameters were successfully measured	E	data format of field: 4-byte real	none	probability	NULL	Positive-real	F6.4	0	1	stat.probability
…											

Table 6-17 MOC map binary table

TTYPE	TTYPE comment	TFORM	TFORM comment	TUNIT	TUNIT comment	TNULL	Data Range	TDISP	TDMIN	TDMAX	TUCD
SNR_LIM	Limiting SNR value	E	data format of field: 4-byte real	none	none	NULL	Positive-real	F8.2	0	inf	Stat.snr
MAG_LIM	Limiting magnitude in band X (TBD)	E	data format of field: 4-byte real	mag	magnitude	NULL	Real	F6.2	-inf	inf	Phot.mag

7 Further Information on Provenance

7.1 Input data used

Describe what input files were used (e.g. 4MOST data products, external physical information, models etc) including version information.
Preliminary list: L2 data product from IWG7 and IWG8; success criteria from surveys; description of the construction of input target catalogues from surveys; L1 products that describe each OB.

The geometric and observational selection functions defined in this DXU describe the selection functions for the 4MOST target catalogues (prepared by surveys). For scientific analysis, this selection function should be combined with the selection in 4MOST target catalogues. How the targets were selected for 4MOST survey are described in TBD.

7.2 Algorithms and software

This section is currently TBD. The general idea of SFs is described in [RD6] and [RD7]. The exact algorithms and software are TBD.

7.3 Physical meaning of parameters

Please elaborate on the TTYPE COMMENT in Table 6 to provide a one paragraph description of each parameter that could be used to inform users of the worldwide data releases about the meaning of those parameters. Include what units are used and the meaning of any restrictions on data range.

7.4 Flag Definition Table

The tables in this DXU contain to flags.

Appendix A Interface Control Drawings

Please insert any relevant drawings here.

Appendix B List of Acronyms

List of Acronyms	
4MOST	4-metre Multi-Object Spectroscopic Telescope
4OR	4MOST Operational Repository
4PA	4MOST Public Archive
AD	Applicable Document
DMS	Data Management System
DRS	Design Reference Surveys
DXU	Data eXchange Unit
FIBINFO	Fibre Information

List of Acronyms	
FITS	Flexible Image Transport System
GSF	Geometric Selection Function
ICD	Interface Control Document
IWG	Infrastructure Working Group
L1-3	Level 1 to 3 Data Products
N/A	Not Applicable
OB	Observation Block
OpSys	Operational Systems
OS	Operations Scientist
OSF	Object Selection Function
PS	Project Scientist
QC	Quality Control
RD	Reference Document
TBD	To be defined
SF	Selection Function
SNR	Signal to Noise Ratio
MOC	Multi-Order Coverage map
VO	Virtual Observatory