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Data Model Documentation – LSST DC2 Schema

About LSST Schema

This document provides an overview of the LSST Data Model (Database Schema Design). The schema is divided into 3 sections: Main Telescope, AuxCalibration and Provenance.

MainTelescope contains a set of tables for capturing data from the main LSST Telescope:

- core Catalogs: Alert, DIASource, MovingObject, Object, Source and VarObject
- Image Metadata
- Calibration of the Main Telescope

AuxCalibration contains a set of tables for capturing data related to calibrating of the auxiliary instruments:

- Object and Source catalogs for auxiliary instruments
- exposures from the auxiliary telescope and IR camera
- spectral energy distribution (SED)
- cloud map
- LIDAR shots.

Provenance contains a set of tables for capturing information about the data from the main telescope and aux instruments. In particular, it will be used to track information about hardware and software configurations used to generate data.

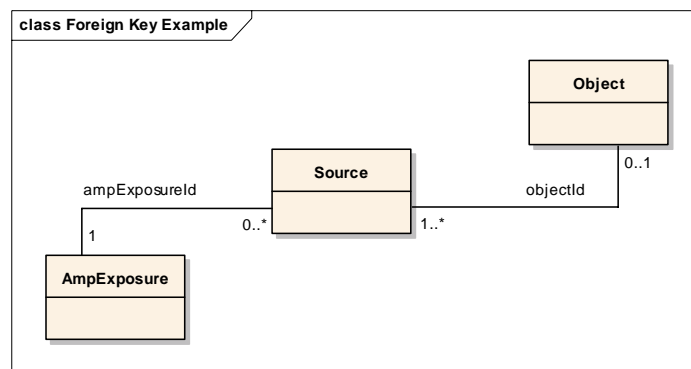
- Hardware related tables capture all key parameters of the hardware used to take data (telescopes, focal planes, rafts, CCDs, amplifiers, filters) and the hardware used to process data (processing nodes).
- Software related tables capture policies used, versions of algorithms, pipeline stages, assignment of processing stages to processing nodes etc.

We believe the Main Telescope section is well thought through. The AuxCalibration section is in very early design stage, it is a placeholder. Provenance section contains a solid skeleton, but most of the actual parameters to be captured inside provenance are not there yet. For example, there is a place for capturing Amplifier specific configuration, but the actual parameters to be kept there are missing.

How to Read This Document

It is best to first study the diagrams. All diagrams have been put in one place, at the beginning of this document. The remainder of the document describes in detailed the three schema sections described above: Main Telescope, AuxCalibration and Provenance, plus the change history of the schema.

The main purpose of the diagrams is to show relationships between tables. Example 1 explains how to read them.



Example: 1

In the above example we have two relations:

- Source table has a relation with Object table through “objectId” column. Each *source* is expected to have 0 or 1 corresponding *objects*. Each *object* is expected to be associated with at least one *source*.
- Source table has a relation with AmpExposure table through “ampExposureId” column. Each *source* is expected to belong to exactly one *ampExposure*, and each *ampExposure* will have 0 or more *sources*.

Such relationships are implemented in a database using **primary keys (PK)** and **foreign keys (FK)** constraints. A *primary key* is an index on a column or a set of columns which have unique not-null values. A *foreign key* identifies a column or a set of columns that references (points to) a column or a set of columns in another table. The referenced column(s) must meet unique-constraint, in most cases they are simply primary keys. In our example:

- Object table has a primary key on a column objectId. This means that each row in Object table must have a unique, valid (not-null) objectId
- Source table has a column which contains objectIds which “point to” rows in the Object table. That is a foreign key.
- AmpExposure table has a primary key on column ampExposureId.
- Source table has a column which contains ampExposureIds which “point to” rows in the AmpExposure table.

If you are unsure which table has primary key and which foreign key, look at the multiplicity: the one which has “1”, or “0-1” next to it is the one that carries primary key.

Diagrams are followed by table describing Columns, Constraints, and Relationships for each table. Here is an example for our simplified, hypothetical Source table:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	sourceId	INTEGER	True	False					This is primary key
False	objectId	INTEGER	False	False					Pointer to Object table
False	ampExposureId	INTEGER	False	False					Pointer to AmpExposure table

Note that the *Type* column is important. If we got it wrong, data might e.g. be stored with insufficient precision!

Constraints

Name	Type	Columns	Initial Code	Notes
FK_Source_AmpExposure	«FK»	ampExposureId		
FK_Source_Object	«FK»	objectId		
PK_Source	«PK»	sourceId		

It summarizes all constraints (primary keys, foreign keys, unique keys) for a given table.

Relationships

Columns	Association	Notes
ampExposureId	0..* Source. 1 AmpExposure.	
objectId	1..* Source. 0..1 Object.	

It summarizes all relationships for a given table.

You will likely notice many tables with “2” in the name, for example _Object2Type in between Object and Type table. These so called “**mapping tables**” are used to implement many-to-many relationships. They belong to a group

of tables called “**internal tables**”. We call “internal tables” all tables that exist due to performance or scaling related optimizations, or are specific to a particular DBMS implementation.

Naming Conventions

Table names use the following naming convention:

<_><prefix><purpose>_<extend>_<component><postfix>

Leading _ is used to show it is an internal table.

Prefix:

- All AuxCalibration tables are prefixed with aux_, example: aux_Object
- All Provenance tables are prefixed with prv_, example: prv_Amplifier. Further, it may be followed by cnf_ which is used for provenance tables containing individual configurations (for example one row in prv_CCD contains information about one particular CCD (which raft it belongs to, which Amplifiers are on this CCD), and prv_cnf_CCD contains information about one specific configuration version of one particular CCD, thus we will have x rows in prv_CCD table where x=number of CCD, and likely many more in prv_cnf_CCD)
- Main Telescope tables contain no prefix.

Purpose: it includes things like Science, Calibration, Bias, Dark, Flat, Fringe, IR.

Extend: FPA, CCD, Amp

Component: Exposure, Object, Source, PSF, WCS...

Postfix: optional.

Mapping tables follows its own naming scheme: _<table X name>2<table Y name>

DC2 Schema

Type: **Package**

Package: DC2 Logical Model

Detail: Created on 9/14/2007. Last modified on 12/3/2007.

Notes:

Ver DC2-1.7 2007-12: deleted VarObject table. Migrated DECIMAL to DOUBLE

Ver DC2-1.6 2007-12: removed NOT NULL from most columns in Object table, added columns needed for DC2 related to D4 images.

Ver DC2-1.5 2007-11: changes to mops_pred: added magErr, removed index

Ver DC2-1.4 2007-11: added tables Id, IdPair, MatchPair

Ver DC2-1.3 2007-11 changed types from DECIMAL to double or float in DIASource. All columns in mops_pred made NOT NULL

Ver DC2-1.2 2007-10: added url to Raw_CCD_Exposure and Science_CCD_Exposure. exposureId in Visit table made unique, removed TemplateImage table, added description to nCombine, changed type of ids for Raw_CCD_Exposure and Science_CCD_Exposure from INT to BIGINT to allow building ids based on more than one number

Ver DC2-1.1 2007-10: imported MOPS schema. Also, renamed the mops tables: added prefix mops_

Main Telescope

Type: **Package**
 Package: PrecursorSchema
 Detail: Created on 2/21/2007. Last modified on 2/21/2007.
 Notes:

Main Catalogs

Created By: Jacek Becla on 1/12/2007
 Last Modified: 11/9/2007, Version:DC2-1.4

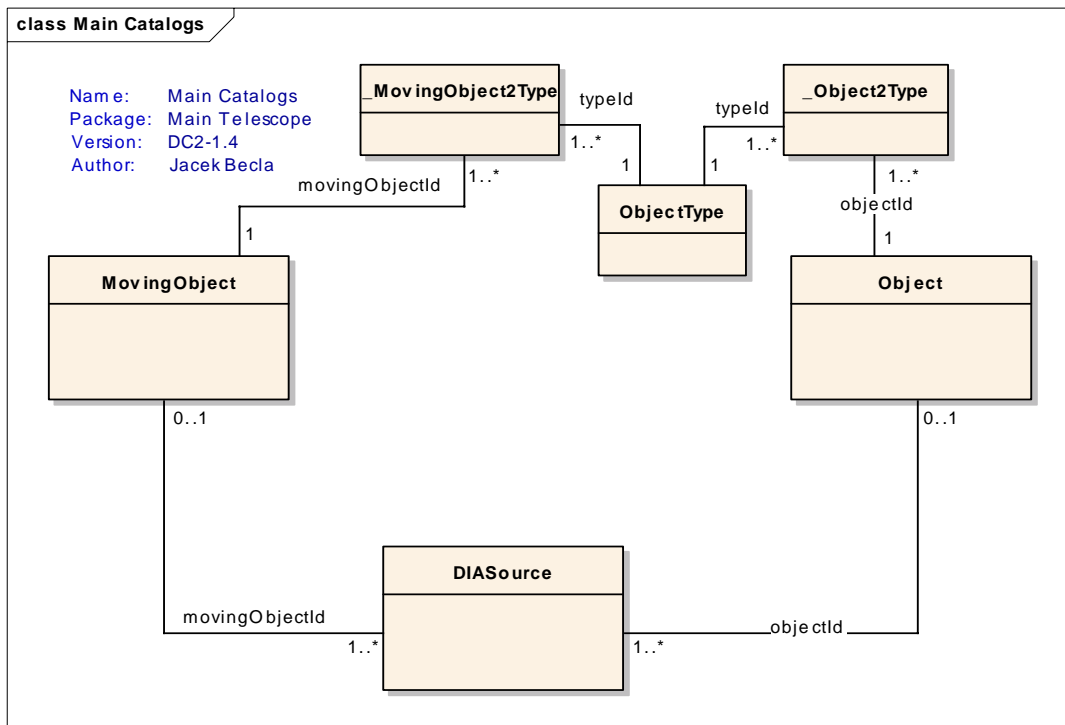


Figure: 1

Image Metadata

Created By: Jacek Becla on 1/12/2007
 Last Modified: 11/9/2007, Version:DC2-1.4

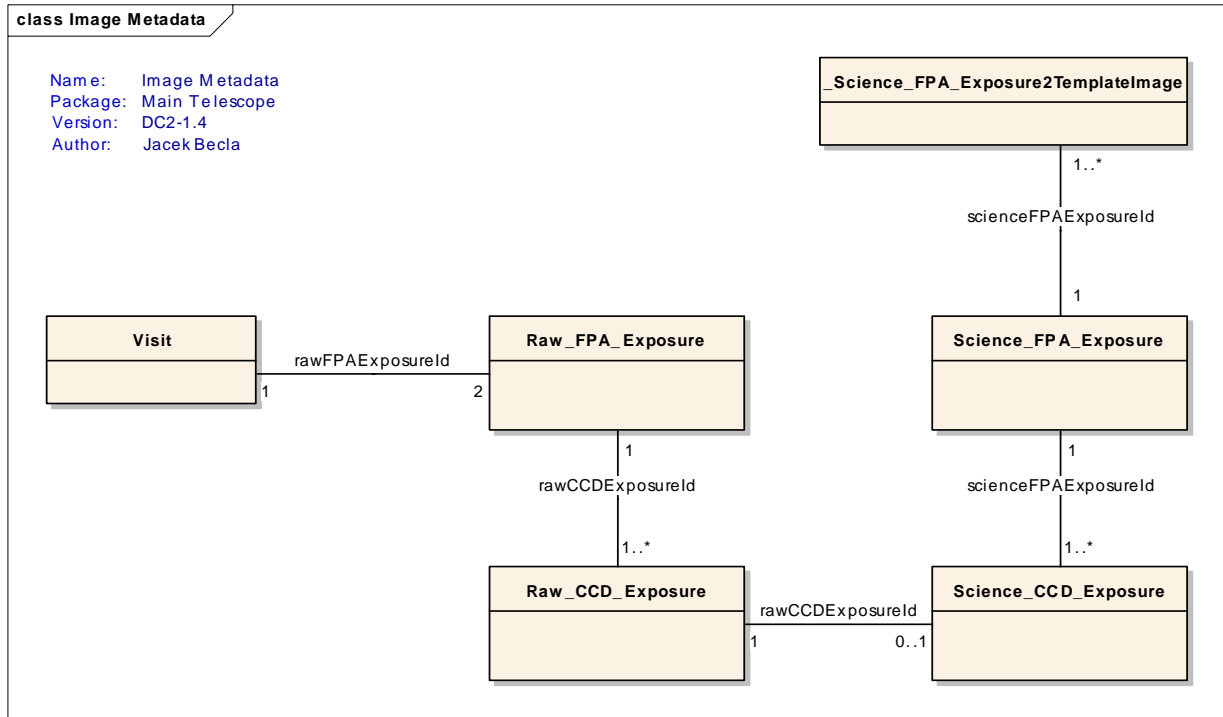


Figure: 2

DIASource

Database: MySQL, *Stereotype:* «table», *Package:* Main Telescope

Detail: Created on 8/29/2005. Last modified on 11/1/2007.

Notes: Table to store all Difference Image Analysis (DIA) Sources.

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	diaSourceId	BIGINT	True	False	0	0	0		Unique id.
False	ampExposureId	BIGINT	True	False	0	0	0		Pointer to Amplifier table - amplifier where the source was measured.
False	filterId	TINYINT	True	False	0	0	0		Pointer to Filter table - filter used to take the Exposure where this source was measured.
False	objectId	BIGINT	False	False	0	0	0		Pointer to Object table. Might be NULL (each DIASource will point to either MovingObject or Object)
False	movingObjectId	BIGINT	False	False	0	0	0		Pointer to MovingObject table. Might be NULL (each DIASource will point to either

									MovingObject or Object)
False	scId	INTEGER	True	False	0	0	0		Pointer to corresponding SourceClassification entry.
False	colc	DOUBLE	True	False		10	0		corresponds to "double_colc"
False	colcErr	FLOAT	True	False	0				Error in pixel X-coordinate.
False	rowc	DOUBLE	True	False	0	10	0		corresponds to "double_rowc"
False	rowcErr	FLOAT	True	False	0				Error in pixel Y-coordinate.
False	dcol	DOUBLE	True	False		10	0		extent in row
False	drow	DOUBLE	True	False		10	0		extent in row
False	ra	DOUBLE	True	False	0	12	9		RA-coordinate of the source centroid (degrees) Need to support accuracy ~ 0.0001 arcsec.
False	decl	DOUBLE	True	False	0	11	9		Dec coordinate of the source centroid (degrees). Need to support accuracy ~0.0001 arcsec.
False	raErr4detection	DOUBLE	True	False		10	2		Error in centroid RA coordinate (miliarcsec) coming from Detection Pipeline [FIXME, maybe use Stage name here?].
False	decErr4detection	DOUBLE	True	False		10	2		Error in centroid Dec coordinate (miliarcsec) coming from Detection Pipeline [FIXME, maybe use Stage name here?].
False	raErr4wcs	DOUBLE	False	False		10	2		Error in centroid RA coordinate (miliarcsec) coming from WCS Stage.
False	decErr4wcs	DOUBLE	False	False		10	2		Error in centroid Dec coordinate (miliarcsec) coming from WCS Stage.
False	cx	DOUBLE	True	False	0	10	2		x-component of the (RA,Dec) unit vector
False	cy	DOUBLE	True	False	0	10	2		y-component of the (RA,Dec) unit vector
False	cz	DOUBLE	True	False	0	10	2		z-component of the (RA,Dec) unit vector

False	taiMidPoint	DOUBLE	True	False		10	2		If a DIASource corresponds to a single exposure, taiMidPoint represents tai time of the middle of exposure. For multiple exposures, this is middle of beginning-of-first-exposure to end-of-last-exposure.
False	taiRange	DOUBLE	True	False		10	2		If a DIASource corresponds to a single exposure, taiRange equals to exposure length. If DIASource corresponds to multiple exposures, it taiRange equals to end-of-last-exposure minus beginning-of-first-exposure.
False	fwhmA	FLOAT	True	False	0				Size of the object along major axis (pixels)
False	fwhmB	FLOAT	True	False	0				Size of the object along minor axis (pixels).
False	fwhmTheta	FLOAT	True	False	0				Position angle of the major axis w.r.t. X-axis (measured in degrees).
False	flux	DOUBLE	True	False		10	2		Measured DIA flux for the source (ADUs). Range is just a guesstimate, based on SM values [FIXME]
False	fluxErr	DOUBLE	True	False		10	2		Error of the measured flux (ADUs). Range is just a guesstimate, based on SM values [FIXME]
False	psfMag	DOUBLE	True	False		10	2		PSF magnitude of the object
False	psfMagErr	DOUBLE	True	False		10	2		Uncertainty of PSF magnitude
False	apMag	DOUBLE	True	False		10	2		Aperture magnitude
False	apMagErr	DOUBLE	True	False		10	2		Uncertainty of aperture magnitude
False	modelMag	DOUBLE	True	False		10	2		model magnitude (adaptive 2D gauss)
False	modelMagErr	DOUBLE	True	False		10	2		Uncertainty of model magnitude.
False	apDia	FLOAT	False	False	0	0	0		Diameter of aperture (pixels)
False	Ixx	FLOAT	False	False	0	0	0		Adaptive second

									moment
False	IxxErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty
False	Iyy	FLOAT	False	False	0	0	0		Adaptive second moment
False	IyyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty
False	Ixy	FLOAT	False	False	0	0	0		Adaptive second moment
False	IxyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty
False	snr	FLOAT	True	False	0	0	0		Signal-to-Noise ratio
False	chi2	FLOAT	True	False	0	0	0		Chi-square value for the PSF fit
False	flag4association	SMALLINT	False	False	0	0	0		Problem/special conditions indicator (Kem noted that these flags could include delta_sky, delta_PSF, ...). FIXME: likely we should use a Stage name here
False	flag4detection	SMALLINT	False	False	0	0	0		Problem/special conditions indicator (Kem noted that these flags could include delta_sky, delta_PSF, ...).
False	flag4wcs	SMALLINT	False	False	0	0	0		Problem/special conditions indicator (Kem noted that these flags could include delta_sky, delta_PSF, ...).
False	_dataSource	TINYINT	True	False					This column is for DC2 only - it indicates which data source given DIASource is coming from.

Constraints

Name	Type	Columns	Initial Code	Notes
PK_DIASource_diaSourceId	Public	diaSourceId		
FK_DIASource_AmpExposure_ampExposureId	Public	ampExposureId		
FK_DIASource_Filter_filterId	Public	filterId		
FK_DIASource_MovingObject_movingObjectId	Public	movingObjectId		
FK_DIASource_Object_objectId	Public	objectId		
FK_DIASource_SourceClassification_scId	Public	scId		

Relationships

Columns	Association	Notes
movingObjectId	1..* DIASource. 0..1 MovingObject.	
objectId	1..* DIASource. 0..1 Object.	

Id

Database: MySQL, *Stereotype:* «table», *Package:* Main Telescope

Detail: Created on 11/9/2007. Last modified on 11/9/2007.

Notes: Schema for lists of ids (e.g. for Objects to delete)

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	id	BIGINT	True	False					

IdPair

Database: MySQL, *Stereotype:* «table», *Package:* Main Telescope

Detail: Created on 11/9/2007. Last modified on 11/9/2007.

Notes: Schema for list of id pairs

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	first	BIGINT	True	False					
False	second	BIGINT	True	False					

MatchPair

Database: MySQL, *Stereotype:* «table», *Package:* Main Telescope

Detail: Created on 11/9/2007. Last modified on 11/9/2007.

Notes: Schema for per-visit match result tables.

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	first	BIGINT	True	False					
False	second	BIGINT	True	False					
False	distance	DOUBL E	True	False		10	0		

MovingObject

Database: MySQL, *Stereotype:* «table», *Package:* Main Telescope

Detail: Created on 12/14/2006. Last modified on 3/1/2007.

Notes: Table to store description of the Solar System (moving) Objects.

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	movingObjectId	BIGINT	True	False	0	0	0		Unique id.
False	procHistoryId	INTEGE R	False	False					Pointer to ProcessingHistory table.

False	a	FLOAT	False	False	0	0	0		semi-major axis of the orbit (AU)
False	incl	FLOAT	False	False	0	0	0		inclination of the orbit (degrees)
False	e	FLOAT	False	False	0	0	0		eccentricity of the orbit
False	periTAI	FLOAT	False	False	0	0	0		TAI of the perihelion passage (comets)
False	periDist	FLOAT	False	False	0	0	0		Perihelion distance (AU)
False	omega	FLOAT	False	False	0	0	0		Argument of perihelion
False	node	FLOAT	False	False	0	0	0		Longitude of the ascending node
False	meanAnom	FLOAT	False	False	0	0	0		Mean anomaly of the orbit
False	qual	FLOAT	False	False	0	0	0		measure of the accuracy of the derived orbit, classification, etc. The field is a PLACEHOLDER, can be multiple floats.
False	uMag	DOUBLE	False	False		5	3		u-magnitude (weighted average)
False	uMagErr	DOUBLE	False	False		5	3		u-magnitude error
False	uAmplitude	FLOAT	False	False	0	0	0		Characteristic magnitude scale of the flux variations for u filter
False	uPeriod	FLOAT	False	False	0	0	0		Period of flux variations (if regular) for u filter
False	gMag	DOUBLE	False	False		5	3		g-magnitude (weighted average)
False	gMagErr	DOUBLE	False	False		5	3		g-magnitude error
False	gAmplitude	FLOAT	False	False	0	0	0		Characteristic magnitude scale of the flux variations for g filter
False	gPeriod	FLOAT	False	False	0	0	0		Period of flux variations (if regular) for g filter
False	rMag	DOUBLE	False	False		5	3		r-magnitude (weighted average)
False	rMagErr	DOUBLE	False	False		5	3		r-magnitude error
False	rAmplitude	FLOAT	False	False	0	0	0		Characteristic magnitude scale of the flux variations for r filter
False	rPeriod	FLOAT	False	False	0	0	0		Period of flux variations (if regular)

								for r filter
False	iMag	DOUBLE	False	False		5	3	i-magnitude (weighted average)
False	iMagErr	DOUBLE	False	False		5	3	i-magnitude error
False	iAmplitude	FLOAT	False	False	0	0	0	Characteristic magnitude scale of the flux variations for i filter
False	iPeriod	FLOAT	False	False	0	0	0	Period of flux variations (if regular) for i filter
False	zMag	DOUBLE	False	False		5	3	z-magnitude (weighted average)
False	zMagErr	DOUBLE	False	False		5	3	z-magnitude error
False	zAmplitude	FLOAT	False	False	0	0	0	Characteristic magnitude scale of the flux variations for z filter
False	zPeriod	FLOAT	False	False	0	0	0	Period of flux variations (if regular) for z filter
False	yMag	DOUBLE	False	False		5	3	y-magnitude (weighted average)
False	yMagErr	DOUBLE	False	False		5	3	y-magnitude error
False	yAmplitude	FLOAT	False	False	0	0	0	Characteristic magnitude scale of the flux variations for y filter
False	yPeriod	FLOAT	False	False	0	0	0	Period of flux variations (if regular) for y filter
False	flag	INTEGER	False	False	0	0	0	Problem/special condition flag.

Constraints

Name	Type	Columns	Initial Code	Notes
PK_MovingObject	Public	movingObjectId		
FK_MovingObject_ProcHistory_procHistoryId	Public	procHistoryId		

Relationships

Columns	Association	Notes
movingObjectId	1..* DIASource. 0..1 MovingObject.	
movingObjectId	1..* _MovingObject2Type. 1 MovingObject.	

Object

Database: MySQL, *Stereotype:* «table», *Package:* Main Telescope

Detail: Created on 8/29/2005. Last modified on 2/21/2007.

Notes: Description of the multi-epoch static object. (Kem: do we link Object and DIAObject tables? Right now it's

done through the source tables)

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	objectId	BIGINT	True	False	0	0	0		Unique id.
False	procHistoryId	INTEGER	False	False					Pointer to ProcessingHistory table.
False	ra	DOUBLE	True	False	0	12	9		RA-coordinate of the object (degrees). Need to support accuracy ~0.0001 arcsec.
False	decl	DOUBLE	True	False	0	11	9		Dec-coordinate of the object (degrees). Need to support accuracy ~0.0001 arcsec
False	__zoneId_placeholder	INTEGER	False	False	0	0	0		
False	muRA	DOUBLE	False	False		12	9		derived proper motion, $\mu_{\alpha} \cos(\text{Dec})$ (measured in arcsec/yr)
False	muDecl	DOUBLE	False	False		11	9		derived proper motion, μ_{δ} (measured in arcsec/yr)
False	muRAErr	DOUBLE	False	False		5	4		Error in ra proper motion
False	muDecErr	DOUBLE	False	False		5	4		Error in Dec proper motion
False	parallax	FLOAT	False	False	0	0	0		derived parallax for the object
False	parallaxErr	FLOAT	False	False	0	0	0		parallax error
False	earliestObsTime	DATETIME	False	False	0	0	0		first observation time
False	latestObsTime	DATETIME	False	False	0	0	0		last observation time
False	ugColor	DOUBLE	False	False		5	3		Precalculated color (difference between u and g).
False	grColor	DOUBLE	False	False		5	3		Precalculated color (difference between g and r).
False	riColor	DOUBLE	False	False		5	3		Precalculated color (difference between r and i).
False	izColor	DOUBLE	False	False		5	3		Precalculated color (difference between i and z).
False	zyColor	DOUBLE	False	False		5	3		Precalculated color (difference between z and y).
False	cx	DOUBLE	False	False		10	2		x-component of the (RA,Dec) unit vector
False	cxErr	DOUBLE	False	False		10	2		

		E							
False	cy	DOUBLE	False	False		10	2		z-component of the (RA,Dec) unit vector
False	cyErr	DOUBLE	False	False		10	2		
False	cz	DOUBLE	False	False		10	2		z-component of the (RA,Dec) unit vector
False	czErr	DOUBLE	False	False		10	2		
False	flag4stage1	INTEGER	False	False	0	0	0		Problem/special condition flag reported by one stage. FIXME: replace with real Stage name
False	flag4stage2	INTEGER	False	False	0	0	0		Problem/special condition flag reported by one stage. FIXME: replace with real Stage name
False	flag4stage3	INTEGER	False	False	0	0	0		Problem/special condition flag reported by one stage. FIXME: replace with real Stage name
False	isProvisional	BOOL	False	False				FALSE	If this is set to true it indicates that the object was created at the base camp. If set to false, it means it was created by Deep Detection.
False	uMag	DOUBLE	False	False		5	3		u-magnitude (weighted average)
False	uMagErr	DOUBLE	False	False		5	3		u-magnitude error
False	uErrA	DOUBLE	False	False		5	2		Large dimension of the position error ellipse, assuming gaussian scatter (arcsec).
False	uErrB	DOUBLE	False	False		5	2		Small dimension of the position error ellipse, assuming gaussian scatter (arcsec).
False	uErrTheta	DOUBLE	False	False		5	2		Orientation of the position error ellipse (degrees).
False	uNumObs	INTEGER	False	False	0	0	0		Number of measurements in the lightcurve for u filter.
False	uVarProb	SMALLINT	False	False	0	0	0		Probability of variability in % (100% = variable object) for u filter. Note: large

									photometric errors do not necessarily mean variability.
False	uAmplitude	FLOAT	False	False	0	0	0		Characteristic magnitude scale of the flux variations for u filter
False	uPeriod	FLOAT	False	False	0	0	0		Period of flux variations (if regular) for u filter
False	uPetroMag	FLOAT	False	False	0	0	0		Petrosian flux for u filter
False	uPetroMagErr	FLOAT	False	False	0	0	0		Petrosian flux error for u filter
False	uIxx	FLOAT	False	False	0	0	0		Adaptive second moment for u filter
False	uIxxErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for u filter
False	uIyy	FLOAT	False	False	0	0	0		Adaptive second moment for u filter
False	uIyyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for u filter
False	uIxy	FLOAT	False	False	0	0	0		Adaptive second moment for u filter
False	uIxyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for u filter
False	uTimescale	DOUBLE	False	False		12	7		Characteristic timescale of flux variations (measured in days). This is to complement period for variables without a well-defined period. Range covered: 0.01 sec - 274 years. LSST images have sampling frequency of ~0.1Hz. For u filter
False	gMag	DOUBLE	False	False		5	3		g-magnitude (weighted average)
False	gMagErr	DOUBLE	False	False		5	3		g-magnitude error
False	gErrA	DOUBLE	False	False		5	2		
False	gErrB	DOUBLE	False	False		5	2		
False	gErrTheta	DOUBLE	False	False		5	2		
False	gNumObs	INTEGER	False	False	0	0	0		
False	gVarProb	SMALLINT	False	False	0	0	0		Probability of variability in % (100%)

									= variable object) for g filter. Note: large photometric errors do not necessarily mean variability.
False	gAmplitude	FLOAT	False	False	0	0	0		
False	gPeriod	FLOAT	False	False	0	0	0		
False	gPetroMag	FLOAT	False	False	0	0	0		Petrosian flux for g filter
False	gPetroMagErr	FLOAT	False	False	0	0	0		Petrosian flux error filter for g filter
False	gIxx	FLOAT	False	False	0	0	0		Adaptive second moment for g filter
False	gIxxErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for g filter
False	gIyy	FLOAT	False	False	0	0	0		Adaptive second moment for g filter
False	gIyyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for g filter
False	gIxy	FLOAT	False	False	0	0	0		Adaptive second moment for g filter
False	gIxyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for g filter
False	gTimescale	DOUBLE	False	False		12	7		
False	rMag	DOUBLE	False	False		5	3		r-magnitude (weighted average)
False	rMagErr	DOUBLE	False	False		5	3		r-magnitude error
False	rErrA	DOUBLE	False	False		5	2		
False	rErrB	DOUBLE	False	False		5	2		
False	rErrTheta	DOUBLE	False	False		5	2		
False	rNumObs	INTEGER	False	False	0	0	0		
False	rVarProb	SMALLINT	False	False	0	0	0		Probability of variability in % (100% = variable object) for r filter. Note: large photometric errors do not necessarily mean variability.
False	rAmplitude	FLOAT	False	False	0	0	0		
False	rPeriod	FLOAT	False	False	0	0	0		
False	rPetroMag	FLOAT	False	False	0	0	0		Petrosian flux for r filter
False	rPetroMagErr	FLOAT	False	False	0	0	0		Petrosian flux error for r filter
False	rIxx	FLOAT	False	False	0	0	0		Adaptive second moment for r filter

False	rIxxErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for r filter
False	rIyy	FLOAT	False	False	0	0	0		Adaptive second moment for r filter
False	rIyyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for r filter
False	rIxy	FLOAT	False	False	0	0	0		Adaptive second moment for r filter
False	rIxyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for r filter
False	rTimescale	DOUBLE	False	False		12	7		
False	iMag	DOUBLE	False	False		5	3		i-magnitude (weighted average)
False	iMagErr	DOUBLE	False	False		5	3		i-magnitude error
False	iErrA	DOUBLE	False	False		5	2		
False	iErrB	DOUBLE	False	False		5	2		
False	iErrTheta	DOUBLE	False	False		5	2		
False	iNumObs	INTEGER	False	False	0	0	0		
False	iVarProb	SMALLINT	False	False	0	0	0		Probability of variability in % (100% = variable object) for i filter. Note: large photometric errors do not necessarily mean variability.
False	iAmplitude	FLOAT	False	False	0	0	0		
False	iPeriod	FLOAT	False	False	0	0	0		
False	iPetroMag	FLOAT	False	False	0	0	0		Petrosian flux for i filter
False	iPetroMagErr	FLOAT	False	False	0	0	0		Petrosian flux error for i filter
False	iIxx	FLOAT	False	False	0	0	0		Adaptive second moment for i filter
False	iIxxErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for i filter
False	iIyy	FLOAT	False	False	0	0	0		Adaptive second moment for i filter
False	iIyyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for i filter
False	iIxy	FLOAT	False	False	0	0	0		Adaptive second moment for i filter
False	iIxyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for i filter

False	iTimescale	DOUBLE	False	False		12	7		
False	zMag	DOUBLE	False	False		5	3		z-magnitude (weighted average)
False	zMagErr	DOUBLE	False	False		5	3		z-magnitude error
False	zErrA	DOUBLE	False	False		5	2		
False	zErrB	DOUBLE	False	False		5	2		
False	zErrTheta	DOUBLE	False	False		5	2		
False	zNumObs	INTEGER	False	False	0	0	0		
False	zVarProb	SMALLINT	False	False	0	0	0		Probability of variability in % (100% = variable object) for z filter. Note: large photometric errors do not necessarily mean variability.
False	zAmplitude	FLOAT	False	False	0	0	0		
False	zPeriod	FLOAT	False	False	0	0	0		
False	zPetroMag	FLOAT	False	False	0	0	0		Petrosian flux for z filter
False	zPetroMagErr	FLOAT	False	False	0	0	0		Petrosian flux error for z filter
False	zIxx	FLOAT	False	False	0	0	0		Adaptive second moment for z filter
False	zIxxErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for z filter
False	zIyy	FLOAT	False	False	0	0	0		Adaptive second moment for z filter
False	zIyyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for z filter
False	zIxy	FLOAT	False	False	0	0	0		Adaptive second moment for z filter
False	zIxyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for z filter
False	zTimescale	DOUBLE	False	False		12	7		
False	yMag	DOUBLE	False	False		5	3		y-magnitude (weighted average)
False	yMagErr	DOUBLE	False	False		5	3		y-magnitude error
False	yErrA	DOUBLE	False	False		5	2		
False	yErrB	DOUBLE	False	False		5	2		
False	yErrTheta	DOUBLE	False	False		5	2		
False	yNumObs	INTEGER	False	False	0	0	0		

		R							
False	yVarProb	SMALLINT	False	False	0	0	0		Probability of variability in % (100% = variable object) for y filter. Note: large photometric errors do not necessarily mean variability.
False	yAmplitude	FLOAT	False	False	0	0	0		
False	yPeriod	FLOAT	False	False	0	0	0		
False	yPetroMag	FLOAT	False	False	0	0	0		Petrosian flux for y filter
False	yPetroMagErr	FLOAT	False	False	0	0	0		Petrosian flux error for y filter
False	yIxx	FLOAT	False	False	0	0	0		Adaptive second moment for y filter
False	yIxxErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for y filter
False	yIyy	FLOAT	False	False	0	0	0		Adaptive second moment for y filter
False	yIyyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for y filter
False	yIxy	FLOAT	False	False	0	0	0		Adaptive second moment for y filter
False	yIxyErr	FLOAT	False	False	0	0	0		Adaptive second moment uncertainty for y filter
False	yTimescale	DOUBLE	False	False		12	7		
False	uScalegram01	FLOAT	False	False	0	0	0		"Scalegram": time series as the average of the squares of the wavelet coefficients at a given scale. See Scargel et al 1993 for more details.
False	uScalegram02	FLOAT	False	False	0	0	0		
False	uScalegram03	FLOAT	False	False	0	0	0		
False	uScalegram04	FLOAT	False	False	0	0	0		
False	uScalegram05	FLOAT	False	False	0	0	0		
False	uScalegram06	FLOAT	False	False	0	0	0		
False	uScalegram07	FLOAT	False	False	0	0	0		
False	uScalegram08	FLOAT	False	False	0	0	0		
False	uScalegram09	FLOAT	False	False	0	0	0		
False	uScalegram10	FLOAT	False	False	0	0	0		
False	uScalegram11	FLOAT	False	False	0	0	0		
False	uScalegram12	FLOAT	False	False	0	0	0		
False	uScalegram13	FLOAT	False	False	0	0	0		
False	uScalegram14	FLOAT	False	False	0	0	0		
False	uScalegram15	FLOAT	False	False	0	0	0		
False	uScalegram16	FLOAT	False	False	0	0	0		
False	uScalegram17	FLOAT	False	False	0	0	0		
False	uScalegram18	FLOAT	False	False	0	0	0		

False	uScalegram19	FLOAT	False	False	0	0	0		
False	uScalegram20	FLOAT	False	False	0	0	0		
False	uScalegram21	FLOAT	False	False	0	0	0		
False	uScalegram22	FLOAT	False	False	0	0	0		
False	uScalegram23	FLOAT	False	False	0	0	0		
False	uScalegram24	FLOAT	False	False	0	0	0		
False	uScalegram25	FLOAT	False	False	0	0	0		
False	gScalegram01	FLOAT	False	False	0	0	0		
False	gScalegram02	FLOAT	False	False	0	0	0		
False	gScalegram03	FLOAT	False	False	0	0	0		
False	gScalegram04	FLOAT	False	False	0	0	0		
False	gScalegram05	FLOAT	False	False	0	0	0		
False	gScalegram06	FLOAT	False	False	0	0	0		
False	gScalegram07	FLOAT	False	False	0	0	0		
False	gScalegram08	FLOAT	False	False	0	0	0		
False	gScalegram09	FLOAT	False	False	0	0	0		
False	gScalegram10	FLOAT	False	False	0	0	0		
False	gScalegram11	FLOAT	False	False	0	0	0		
False	gScalegram12	FLOAT	False	False	0	0	0		
False	gScalegram13	FLOAT	False	False	0	0	0		
False	gScalegram14	FLOAT	False	False	0	0	0		
False	gScalegram15	FLOAT	False	False	0	0	0		
False	gScalegram16	FLOAT	False	False	0	0	0		
False	gScalegram17	FLOAT	False	False	0	0	0		
False	gScalegram18	FLOAT	False	False	0	0	0		
False	gScalegram19	FLOAT	False	False	0	0	0		
False	gScalegram20	FLOAT	False	False	0	0	0		
False	gScalegram21	FLOAT	False	False	0	0	0		
False	gScalegram22	FLOAT	False	False	0	0	0		
False	gScalegram23	FLOAT	False	False	0	0	0		
False	gScalegram24	FLOAT	False	False	0	0	0		
False	gScalegram25	FLOAT	False	False	0	0	0		
False	rScalegram01	FLOAT	False	False	0	0	0		
False	rScalegram02	FLOAT	False	False	0	0	0		
False	rScalegram03	FLOAT	False	False	0	0	0		
False	rScalegram04	FLOAT	False	False	0	0	0		
False	rScalegram05	FLOAT	False	False	0	0	0		
False	rScalegram06	FLOAT	False	False	0	0	0		
False	rScalegram07	FLOAT	False	False	0	0	0		
False	rScalegram08	FLOAT	False	False	0	0	0		
False	rScalegram09	FLOAT	False	False	0	0	0		
False	rScalegram10	FLOAT	False	False	0	0	0		
False	rScalegram11	FLOAT	False	False	0	0	0		
False	rScalegram12	FLOAT	False	False	0	0	0		
False	rScalegram13	FLOAT	False	False	0	0	0		
False	rScalegram14	FLOAT	False	False	0	0	0		
False	rScalegram15	FLOAT	False	False	0	0	0		
False	rScalegram16	FLOAT	False	False	0	0	0		
False	rScalegram17	FLOAT	False	False	0	0	0		
False	rScalegram18	FLOAT	False	False	0	0	0		
False	rScalegram19	FLOAT	False	False	0	0	0		
False	rScalegram20	FLOAT	False	False	0	0	0		
False	rScalegram21	FLOAT	False	False	0	0	0		
False	rScalegram22	FLOAT	False	False	0	0	0		
False	rScalegram23	FLOAT	False	False	0	0	0		

False	rScalegram24	FLOAT	False	False	0	0	0		
False	rScalegram25	FLOAT	False	False	0	0	0		
False	iScalegram01	FLOAT	False	False	0	0	0		
False	iScalegram02	FLOAT	False	False	0	0	0		
False	iScalegram03	FLOAT	False	False	0	0	0		
False	iScalegram04	FLOAT	False	False	0	0	0		
False	iScalegram05	FLOAT	False	False	0	0	0		
False	iScalegram06	FLOAT	False	False	0	0	0		
False	iScalegram07	FLOAT	False	False	0	0	0		
False	iScalegram08	FLOAT	False	False	0	0	0		
False	iScalegram09	FLOAT	False	False	0	0	0		
False	iScalegram10	FLOAT	False	False	0	0	0		
False	iScalegram11	FLOAT	False	False	0	0	0		
False	iScalegram12	FLOAT	False	False	0	0	0		
False	iScalegram13	FLOAT	False	False	0	0	0		
False	iScalegram14	FLOAT	False	False	0	0	0		
False	iScalegram15	FLOAT	False	False	0	0	0		
False	iScalegram16	FLOAT	False	False	0	0	0		
False	iScalegram17	FLOAT	False	False	0	0	0		
False	iScalegram18	FLOAT	False	False	0	0	0		
False	iScalegram19	FLOAT	False	False	0	0	0		
False	iScalegram20	FLOAT	False	False	0	0	0		
False	iScalegram21	FLOAT	False	False	0	0	0		
False	iScalegram22	FLOAT	False	False	0	0	0		
False	iScalegram23	FLOAT	False	False	0	0	0		
False	iScalegram24	FLOAT	False	False	0	0	0		
False	iScalegram25	FLOAT	False	False	0	0	0		
False	zScalegram01	FLOAT	False	False	0	0	0		
False	zScalegram02	FLOAT	False	False	0	0	0		
False	zScalegram03	FLOAT	False	False	0	0	0		
False	zScalegram04	FLOAT	False	False	0	0	0		
False	zScalegram05	FLOAT	False	False	0	0	0		
False	zScalegram06	FLOAT	False	False	0	0	0		
False	zScalegram07	FLOAT	False	False	0	0	0		
False	zScalegram08	FLOAT	False	False	0	0	0		
False	zScalegram09	FLOAT	False	False	0	0	0		
False	zScalegram10	FLOAT	False	False	0	0	0		
False	zScalegram11	FLOAT	False	False	0	0	0		
False	zScalegram12	FLOAT	False	False	0	0	0		
False	zScalegram13	FLOAT	False	False	0	0	0		
False	zScalegram14	FLOAT	False	False	0	0	0		
False	zScalegram15	FLOAT	False	False	0	0	0		
False	zScalegram16	FLOAT	False	False	0	0	0		
False	zScalegram17	FLOAT	False	False	0	0	0		
False	zScalegram18	FLOAT	False	False	0	0	0		
False	zScalegram19	FLOAT	False	False	0	0	0		
False	zScalegram20	FLOAT	False	False	0	0	0		
False	zScalegram21	FLOAT	False	False	0	0	0		
False	zScalegram22	FLOAT	False	False	0	0	0		
False	zScalegram23	FLOAT	False	False	0	0	0		
False	zScalegram24	FLOAT	False	False	0	0	0		
False	zScalegram25	FLOAT	False	False	0	0	0		
False	yScalegram01	FLOAT	False	False	0	0	0		
False	yScalegram02	FLOAT	False	False	0	0	0		
False	yScalegram03	FLOAT	False	False	0	0	0		

False	yScalegram04	FLOAT	False	False	0	0	0		
False	yScalegram05	FLOAT	False	False	0	0	0		
False	yScalegram06	FLOAT	False	False	0	0	0		
False	yScalegram07	FLOAT	False	False	0	0	0		
False	yScalegram08	FLOAT	False	False	0	0	0		
False	yScalegram09	FLOAT	False	False	0	0	0		
False	yScalegram10	FLOAT	False	False	0	0	0		
False	yScalegram11	FLOAT	False	False	0	0	0		
False	yScalegram12	FLOAT	False	False	0	0	0		
False	yScalegram13	FLOAT	False	False	0	0	0		
False	yScalegram14	FLOAT	False	False	0	0	0		
False	yScalegram15	FLOAT	False	False	0	0	0		
False	yScalegram16	FLOAT	False	False	0	0	0		
False	yScalegram17	FLOAT	False	False	0	0	0		
False	yScalegram18	FLOAT	False	False	0	0	0		
False	yScalegram19	FLOAT	False	False	0	0	0		
False	yScalegram20	FLOAT	False	False	0	0	0		
False	yScalegram21	FLOAT	False	False	0	0	0		
False	yScalegram22	FLOAT	False	False	0	0	0		
False	yScalegram23	FLOAT	False	False	0	0	0		
False	yScalegram24	FLOAT	False	False	0	0	0		
False	yScalegram25	FLOAT	False	False	0	0	0		
False	redshift	FLOAT	False	False	0				Photometric redshift.
False	redshiftErr	FLOAT	False	False	0				Photometric redshift uncertainty.
False	probability	TINYINT	False	False	0	0	0		Probability that given object has photo-z. 0-100. In %. Default 100%.
False	photoZ1	FLOAT	False	False	0	0	0		
False	photoZ1Err	FLOAT	False	False	0	0	0		
False	photoZ2	FLOAT	False	False	0	0	0		
False	photoZ2Err	FLOAT	False	False	0	0	0		
False	photoZ1Outlier	FLOAT	False	False	0	0	0		
False	photoZ2Outlier	FLOAT	False	False	0	0	0		
False	uApMag	DOUBLE	False	False		10	0		Fixed aperture magnitude vector for u filter
False	uApMagErr	DOUBLE	False	False		10	0		
False	uIsoAreaImage	DOUBLE	False	False		10	0		Isophotal area above Analysis threshold > [pixel**2]
False	uMuMax	DOUBLE	False	False		10	0		Peak surface brightness above background > [mag * arcsec**(-2)]
False	uFluxRadius	DOUBLE	False	False		10	0		raction-of-light radii [pixel]
False	gApMag	DOUBLE	False	False		10	0		Fixed aperture magnitude vector for g filter
False	gApMagErr	DOUBLE	False	False		10	0		
False	gIsoAreaImage	DOUBLE	False	False		10	0		Isophotal area above

		E							Analysis threshold > [pixel]**2]
False	gMuMax	DOUBLE	False	False		10	0		Peak surface brightness above background > [mag * arcsec]**(-2)]
False	gFluxRadius	DOUBLE	False	False		10	0		raction-of-light radii [pixel]
False	rApMag	DOUBLE	False	False		10	0		Fixed aperture magnitude vector for r filter
False	rApMagErr	DOUBLE	False	False		10	0		
False	rIsoAreaImage	DOUBLE	False	False		10	0		Isophotal area above Analysis threshold > [pixel]**2]
False	rMuMax	DOUBLE	False	False		10	0		Peak surface brightness above background > [mag * arcsec]**(-2)]
False	rFluxRadius	DOUBLE	False	False		10	0		raction-of-light radii [pixel]
False	iApMag	DOUBLE	False	False		10	0		Fixed aperture magnitude vector for i filter
False	iApMagErr	DOUBLE	False	False		10	0		
False	iIsoAreaImage	DOUBLE	False	False		10	0		Isophotal area above Analysis threshold > [pixel]**2]
False	iMuMax	DOUBLE	False	False		10	0		Peak surface brightness above background > [mag * arcsec]**(-2)]
False	iFluxRadius	DOUBLE	False	False		10	0		raction-of-light radii [pixel]
False	zApMag	DOUBLE	False	False		10	0		Fixed aperture magnitude vector for z filter
False	zApMagErr	DOUBLE	False	False		10	0		
False	zIsoAreaImage	DOUBLE	False	False		10	0		Isophotal area above Analysis threshold > [pixel]**2]
False	zMuMax	DOUBLE	False	False		10	0		Peak surface brightness above background > [mag * arcsec]**(-2)]
False	zFluxRadius	DOUBLE	False	False		10	0		raction-of-light radii [pixel]
False	yApMag	DOUBLE	False	False		10	0		Fixed aperture magnitude vector for y filter
False	yApMagErr	DOUBLE	False	False		10	0		

False	yIsoAreaImage	DOUBLE	False	False		10	0		Isophotal area above Analysis threshold > [pixel**2]
False	yMuMax	DOUBLE	False	False		10	0		Peak surface brightness above background > [mag * arcsec**(-2)]
False	yFluxRadius	DOUBLE	False	False		10	0		raction-of-light radii [pixel]
False	uFlags	INTEGER	False	False					
False	gFlags	INTEGER	False	False					
False	rFlags	INTEGER	False	False					
False	iFlags	INTEGER	False	False					
False	zFlags	INTEGER	False	False					
False	yFlags	INTEGER	False	False					

Constraints

Name	Type	Columns	Initial Code	Notes
PK_Object_objectId	Public	objectId		
idx_Object_ugColor	Public	ugColor		
idx_Object_grColor	Public	grColor		
idx_Object_riColor	Public	riColor		
idx_Object_izColor	Public	izColor		
idx_Object_zyColor	Public	zyColor		
idx_Object_latestObsTime	Public	latestObsTime		
FK_Object_ProcHistory_procHistoryId	Public	procHistoryId		

Relationships

Columns	Association	Notes
objectId	1..* DIASource. 0..1 Object.	
objectId	1..* _Object2Type. 1 Object.	

MOPS*Type:**Package:**Detail:**Notes:***Package**

Main Telescope

Created on 10/5/2007. Last modified on 10/5/2007.

mops_ephem

Database: MySql, *Stereotype:* «table», *Package:* MOPS

Detail: Created on 10/5/2007. Last modified on 10/5/2007.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	orbit_id	BIGINT	True	False	0	0	0		
False	ra_deg	DOUBL E	True	False	0	0	0		
False	dec_deg	DOUBL E	True	False	0	0	0		
False	mjd	DOUBL E	True	False	0	0	0		
False	smia	DOUBL E	False	False	0	0	0		
False	smaa	DOUBL E	False	False	0	0	0		
False	pa	DOUBL E	False	False	0	0	0		
False	mag	DOUBL E	False	False	0	0	0		

Constraints

Name	Type	Columns	Initial Code	Notes
orbit_id_index	Public	orbit_id		

mops_orbits

Database: MySql, *Stereotype:* «table», *Package:* MOPS

Detail: Created on 10/5/2007. Last modified on 10/5/2007.

Notes: InnoDB free: 4096 kB

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	orbit_id	BIGINT	True	False	0	0	0		
False	q	DOUBL E	True	False	0	0	0	0	
False	e	DOUBL E	True	False	0	0	0	0	
False	i	DOUBL E	True	False	0	0	0	0	
False	node	DOUBL E	True	False	0	0	0	0	
False	arg_peri	DOUBL E	True	False	0	0	0	0	
False	time_peri	DOUBL E	True	False	0	0	0	0	
False	epoch	DOUBL E	True	False	0	0	0	0	
False	h_v	DOUBL E	True	False	0	0	0	0	
False	residual	DOUBL	True	False	0	0	0	0	

		E							
False	chi_squared	DOUBLE	False	False	0	0	0		
False	cov_01	DOUBLE	False	False	0	0	0		
False	cov_02	DOUBLE	False	False	0	0	0		
False	cov_03	DOUBLE	False	False	0	0	0		
False	cov_04	DOUBLE	False	False	0	0	0		
False	cov_05	DOUBLE	False	False	0	0	0		
False	cov_06	DOUBLE	False	False	0	0	0		
False	cov_07	DOUBLE	False	False	0	0	0		
False	cov_08	DOUBLE	False	False	0	0	0		
False	cov_09	DOUBLE	False	False	0	0	0		
False	cov_10	DOUBLE	False	False	0	0	0		
False	cov_11	DOUBLE	False	False	0	0	0		
False	cov_12	DOUBLE	False	False	0	0	0		
False	cov_13	DOUBLE	False	False	0	0	0		
False	cov_14	DOUBLE	False	False	0	0	0		
False	cov_15	DOUBLE	False	False	0	0	0		
False	cov_16	DOUBLE	False	False	0	0	0		
False	cov_17	DOUBLE	False	False	0	0	0		
False	cov_18	DOUBLE	False	False	0	0	0		
False	cov_19	DOUBLE	False	False	0	0	0		
False	cov_20	DOUBLE	False	False	0	0	0		
False	cov_21	DOUBLE	False	False	0	0	0		
False	conv_code	VARCHAR	False	False	8	0	0		
False	o_minus_c	DOUBLE	False	False	0	0	0		
False	moid_1	DOUBLE	False	False	0	0	0		
False	moid_long_1	DOUBLE	False	False	0	0	0		
False	moid_2	DOUBLE	False	False	0	0	0		

False	moid_long_2	DOUBLE	False	False	0	0	0		
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Constraints

Name	Type	Columns	Initial Code	Notes
PK_orbits	Public	orbit_id		
orbit_id	Public	orbit_id		

mops_pred

Database: MySQL, *Stereotype*: «table», *Package*: MOPS
 Detail: Created on 10/5/2007. Last modified on 10/5/2007.
 Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	orbit_id	BIGINT	True	False					
False	ra_deg	DOUBLE	True	False		0	0		
False	dec_deg	DOUBLE	True	False		0	0		
False	mjd	DOUBLE	True	False		0	0		
False	smia	DOUBLE	True	False		0	0		
False	smaa	DOUBLE	True	False		0	0		
False	pa	DOUBLE	True	False		0	0		
False	mag	DOUBLE	True	False		0	0		
False	magErr	FLOAT	True	False	0				

Image Metadata

Type: **Package**
 Package: Main Telescope
 Detail: Created on 2/20/2007. Last modified on 2/21/2007.
 Notes:

Raw_CCD_Exposure

Database: MySQL, *Stereotype*: «table», *Package*: Image Metadata
 Detail: Created on 2/8/2007. Last modified on 9/4/2007.
 Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	rawCCDExposureId	BIGINT	True	False					ccd raw exposure id (science raw image)
False	ccdDetectorId	INTEGER	True	False	0	0	0		Pointer to the Exposure that this CCDExposure belongs to

False	rawFPAExposureId	INTEGER	True	False	0	0	0		pointer to Raw_FPA_Exposure
False	filterId	INTEGER	True	False	0	0	0		
False	radecSys	VARCHAR	False	False	20	0	0		Coordinate system type. (Allowed systems: FK5, ICRS)
False	ra	DOUBLE	False	False	0	12	9		Right Ascension of aperture center.
False	decl	DOUBLE	False	False	0	12	9		Declination of aperture center.
False	equinox	FLOAT	True	False	0	0	0		Equinox of World Coordinate System.
False	url	VARCHAR	False	False	255				Logical URL to the actual raw image.
False	ctype1	VARCHAR	True	False	20	0	0		Coordinate projection type, axis 1.
False	ctype2	VARCHAR	True	False	20	0	0		Coordinate projection type, axis 2.
False	crpix1	FLOAT	True	False	0	0	0		Coordinate reference pixel, axis 1.
False	crpix2	FLOAT	True	False	0	0	0		Coordinate reference pixel, axis 2.
False	crval1	DOUBLE	True	False	0	10	0		Coordinate value 1 @reference pixel.
False	crval2	DOUBLE	True	False	0	10	0		Coordinate value 2 @reference pixel.
False	cd11	DOUBLE	True	False	0	10	0		First derivative of coordinate 1 w.r.t. axis 1.
False	cd21	DOUBLE	True	False	0	10	0		First derivative of coordinate 2 w.r.t. axis 1.
False	cd12	DOUBLE	True	False	0	10	0		First derivative of coordinate 1 w.r.t. axis 2.
False	cd22	DOUBLE	True	False	0	10	0		First derivative of coordinate 2 w.r.t. axis 2.
False	dateObs	DATETIME	True	False	0	0	0		Date/Time of observation start (UTC).
False	taiObs	DATETIME	False	False	0	0	0		TAI-OBS = UTC + offset, offset = 32 s from 1/1/1999 to 1/1/2006
False	mjdObs	DOUBLE	False	False	0	10	0		MJD of observation start.
False	expTime	FLOAT	True	False	0	0	0		Duration of exposure.
False	darkTime	FLOAT	False	False	0	0	0		Total elapsed time from exposure start to end of read.
False	zd	FLOAT	True	False	0	0	0		Zenith distance at observation mid-point.
False	airmass	FLOAT	False	False	0	0	0		Airmass value for the

										Amp reference pixel (preferably center, but not guaranteed). Range: [-99.999, 99.999] is enough to accomodate ZD in [0, 89.433].
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Constraints

Name	Type	Columns	Initial Code	Notes
FK_Raw_CCD_Exposure_Raw_FPA_Exposure	Public	rawFPAExposureId		
PK_CCDExposure_ccdExposureId	Public	rawCCDExposureId		
FK_CCDExposure_FPAExposure_exposureId	Public	ccdDetectorId		

Relationships

Columns	Association	Notes
rawCCDExposureId	1..* Raw_CCD_Exposure. 1 Raw_FPA_Exposure.	
rawCCDExposureId	0..1 Science_CCD_Exposure. 1 Raw_CCD_Exposure.	

Raw_FPA_Exposure

Database: MySQL, Stereotype: «table», Package: Image Metadata

Detail: Created on 9/14/2007. Last modified on 9/14/2007.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	rawFPAExposureId	INTEGER	True	False	0	0	0		

Constraints

Name	Type	Columns	Initial Code	Notes
PK_Raw_FPA_Exposure	Public	rawFPAExposureId		

Relationships

Columns	Association	Notes
exposureId	0..* _Raw_FPA_Exposure2Visit. 1 Raw_FPA_Exposure.	
rawFPAExposureId	1 Visit. 2 Raw_FPA_Exposure.	
rawCCDExposureId	1..* Raw_CCD_Exposure. 1 Raw_FPA_Exposure.	

Science_CCD_Exposure

Database: MySQL, Stereotype: «table», Package: Image Metadata

Detail: Created on 9/4/2007. Last modified on 9/4/2007.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	scienceCCDExposureId	BIGINT	True	False					Id of te Science CCD Exposure
False	scienceFPAExposureId	INTEGER	True	False	0	0	0		
False	rawCCDExposureId	BIGINT	True	False	0	0	0		Pointer to raw exposure.
False	ccdDetectorId	INTEGER	False	False	0	0	0		points to detector information
False	filterId	INTEGER	True	False	0	0	0		Pointer to filter.
False	equinox	FLOAT	True	False	0	0	0		Equinox of World Coordinate System.
False	url	VARCHAR	True	False	255				Logical URL to the actual calibrated image.
False	ctype1	VARCHAR	True	False	20	0	0		Coordinate projection type, axis 1.
False	ctype2	VARCHAR	True	False	20	0	0		Coordinate projection type, axis 2.
False	crpix1	FLOAT	True	False	0	0	0		Coordinate reference pixel, axis 1.
False	crpix2	FLOAT	True	False	0	0	0		Coordinate reference pixel, axis 2.
False	crval1	DOUBLE	True	False	0	10	0		Coordinate value 1 @reference pixel.
False	crval2	DOUBLE	True	False	0	10	0		Coordinate value 2 @reference pixel.
False	cd1_1	DOUBLE	True	False	0	10	0		First derivative of coordinate 1 w.r.t. axis 1.
False	cd2_1	DOUBLE	True	False	0	10	0		First derivative of coordinate 2 w.r.t. axis 1.
False	cd1_2	DOUBLE	True	False	0	10	0		First derivative of coordinate 1 w.r.t. axis 2.
False	cd2_2	DOUBLE	True	False	0	10	0		First derivative of coordinate 2 w.r.t. axis 2.
False	dateObs	DATETIME	True	False	0	0	0		Date/Time of observation start (UTC).
False	expTime	FLOAT	True	False	0	0	0		Duration of exposure.
False	photoFlam	FLOAT	True	False	0	0	0		Inverse sensitivity.
False	photoZP	FLOAT	True	False	0	0	0		System photometric zero-point.
False	nCombine	INTEGER	True	False				1	Number of images co-added to create a deeper image

Constraints

Name	Type	Columns	Initial Code	Notes
FK_Science_CCD_Exposure_Raw_CCD_Exposure	Public	rawCCDExposureId		

Name	Type	Columns	Initial Code	Notes
FK_Science_CCD_Exposure_Science_FPA_Exposure	Public	scienceFPAExposureId		
PK_Science_CCD_Exposure	Public	scienceCCDExposureId		

Relationships

Columns	Association	Notes
scienceFPAExposureId	1..* Science_CCD_Exposure. 1 Science_FPA_Exposure.	
rawCCDExposureId	0..1 Science_CCD_Exposure. 1 Raw_CCD_Exposure.	

Science_FPA_Exposure

Database: MySQL, *Stereotype:* «table», *Package:* Image Metadata

Detail: Created on 9/14/2007. Last modified on 9/14/2007.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	scienceFPAExposureId	INTEGER	True	False	0	0	0		

Constraints

Name	Type	Columns	Initial Code	Notes
PK_Science_FPA_Exposure	Public	scienceFPAExposureId		

Relationships

Columns	Association	Notes
scienceFPAExposureId	1..* _Science_FPA_Exposure2TemplateImage. 1 Science_FPA_Exposure.	
scienceFPAExposureId	1..* Science_CCD_Exposure. 1 Science_FPA_Exposure.	

Visit

Database: MySQL, *Stereotype:* «table», *Package:* Image Metadata

Detail: Created on 2/1/2007. Last modified on 2/20/2007.

Notes: Defines a single Visit. 1 row per LSST visit.

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	visitId	INTEGER	True	False	0	0	0		Unique id.
False	exposureId	INTEGER	True	True					

Constraints

Name	Type	Columns	Initial Code	Notes
FK_Visit_Raw_FPA_Exposure	Public	exposureId		

Name	Type	Columns	Initial Code	Notes
re				

Relationships

Columns	Association	Notes
visitId	1..* _Raw_FPA_Exposure2Visit. 1 Visit.	
rawFPAExposureId	1 Visit. 2 Raw_FPA_Exposure.	

Raw_FPA_Exposure2Visit

Database: MySQL, *Stereotype*: «table», *Package*: Image Metadata

Detail: Created on 2/1/2007. Last modified on 9/14/2007.

Notes: Mapping table: exposures --> visit

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	visitId	INTEGE R	True	False	0	0	0		Pointer to entry in Visit table - visit that given Exposure belongs to.
False	exposureId	INTEGE R	True	False	0	0	0		Pointer to entry in Exposure table

Constraints

Name	Type	Columns	Initial Code	Notes
FK_Raw_FPA_Exposure2V isit_Raw_FPA_Exposure	Public	exposureId		
FK_Exposure2Visit_Exposur e_exposureId	Public	exposureId		
FK_Exposure2Visit_Visit_vi sitId	Public	visitId		

Relationships

Columns	Association	Notes
visitId	1..* _Raw_FPA_Exposure2Visit. 1 Visit.	
exposureId	0..* _Raw_FPA_Exposure2Visit. 1 Raw_FPA_Exposure.	

Science_FPA_Exposure2TemplateImage

Database: MySQL, *Stereotype*: «table», *Package*: Image Metadata

Detail: Created on 2/15/2007. Last modified on 9/14/2007.

Notes: Mapping table: exposures used to build given template image

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	scienceFPAEposureI d	INTEGE R	True	False	0	0	0		Pointer to an entry in Exposure table.
False	templateImageId	INTEGE R	True	False	0	0	0		Pointer to an entry in TemplateImage table.

Constraints

Name	Type	Columns	Initial Code	Notes
FK__Science_FPA_Exposure2TemplateImage_Science_FPA_Exposure	Public	scienceFPAEposureId		
FK_Exposure2TemplateImage_TemplateImage_templateImageId	Public	templateImageId		
FK_Exposure2TemplateImage_FPAExposure_exposureId	Public	scienceFPAEposureId		

Relationships

Columns	Association	Notes
scienceFPAExposureId	1..* _Science_FPA_Exposure2TemplateImage. 1 Science_FPA_Exposure.	

_Science_FPA_Exposure_Group

Database: MySQL, *Stereotype:* «table», *Package:* Image Metadata

Detail: Created on 2/8/2007. Last modified on 9/4/2007.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	cseGroupId	MEDIUMINT	True	False	0	0	0		Unique id.
False	darkTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMDarkExposure was processed.
False	biasTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMBiasExposure was processed.
False	u_fringeTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFringeExposure was processed. For u filter.
False	g_fringeTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFringeExposure was processed. For g filter.
False	r_fringeTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFringeExposure was processed. For r filter.
False	i_fringeTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFringeExposure was processed. For i filter.
False	z_fringeTime	DATETIME	False	False	0	0	0		Timestamp when

		ME							corresponding CMFringeExposure was processed. For z filter.
False	y_fringeTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFringeExposure was processed. For y filter.
False	u_flatTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFlatExposure was processed. For u filter.
False	g_flatTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFlatExposure was processed. For g filter.
False	r_flatTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFlatExposure was processed. For r filter.
False	i_flatTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFlatExposure was processed. For i filter.
False	z_flatTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFlatExposure was processed. For z filter.
False	y_flatTime	DATETIME	False	False	0	0	0		Timestamp when corresponding CMFlatExposure was processed. For y filter.
False	cmBiasExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterBias Exposure.
False	cmDarkExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterDark Exposure.
False	u_cmFlatExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFlatExposure for u filter.
False	g_cmFlatExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFlatExposure for g filter.
False	r_cmFlatExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFlatExposure for r filter.
False	i_cmFlatExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFlatExposure for i filter.
False	z_cmFlatExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFlatExposure for z filter.

False	y_cmFlatExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFlatExposure for y filter.
False	u_cmFringeExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFringeExposure for u filter.
False	g_cmFringeExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFringeExposure for g filter.
False	r_cmFringeExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFringeExposure for r filter.
False	i_cmFringeExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFringeExposure for i filter.
False	z_cmFringeExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFringeExposure for z filter.
False	y_cmFringeExposureId	INTEGER	False	False	0	0	0		Pointer to CalibratedMasterFringeExposure for y filter.

Constraints

Name	Type	Columns	Initial Code	Notes
FK_CalibratedScienceExposure_Group_CMBiasExposure	Public	cmBiasExposureId		
FK_CalibratedScienceExposure_Group_CMDarkExposure	Public	cmDarkExposureId		
FK_u_cmFlatExposureId	Public	u_cmFlatExposureId		Foreign key constraint
PK_CalibratedScienceExposure_Group	Public	cseGroupId		

Others

Type: **Package**
Package: Main Telescope
Detail: Created on 2/20/2007. Last modified on 2/21/2007.
Notes:

CCD_Detector

Database: MySql, **Stereotype:** «table», **Package:** Others
Detail: Created on 9/14/2007. Last modified on 9/14/2007.
Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	ccdDetectorId	INTEGER	True	False	0	0	0	1	from file name (required for raw science images)
False	biasSec	VARCHAR	True	False	20			'[0:0:0]'	Bias section (ex: '[2045:2108,1:4096]')
False	trimSec	VARCHAR	True	False	20			'[0:0:0]'	Trim section (ex:

		AR						0]	'[1:2044,1:4096]')
False	gain	FLOAT	False	False	0	0	0		Detector/amplifier gain
False	rdNoise	FLOAT	False	False	0	0	0		Read noise for detector/amplifier
False	saturate	FLOAT	False	False	0	0	0		Maximum data value for A/D converter

Constraints

Name	Type	Columns	Initial Code	Notes
PK_CCD_Detector	Public	ccdDetectorId		

DIASourceIDTonight

Database: MySQL, Stereotype: «table», Package: Others

Detail: Created on 9/14/2007. Last modified on 9/14/2007.

Notes: Table for storing IDs of DIASources generated during given night. For basecamp only.

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	DIASourceId	BIGINT	True	False	0	0	0		

Filter

Database: MySQL, Stereotype: «table», Package: Others

Detail: Created on 9/14/2007. Last modified on 9/14/2007.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	filterId	INTEGER	True	False	0	0	0		
False	filtURL	VARCHAR	False	False	255	0	0		URL for filter transmission curve
False	filtName	VARCHAR	True	False	255	0	0		Filter name
False	photClam	FLOAT	True	False	0	0	0		Filter centroid wavelength
False	photBW	FLOAT	True	False	0	0	0		System effective bandwidth

Constraints

Name	Type	Columns	Initial Code	Notes
PK_Filter	Public	filterId		

ObjectType

Database: MySQL, Stereotype: «table», Package: Others

Detail: Created on 12/14/2006. Last modified on 2/20/2007.

Notes: Table to store description of object types. It includes all object types: static, variables, Solar System objects, etc.

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
True	typeId	SMALLINT	True	False	0	0	0		Unique id.
False	description	VARCHAR	False	False	255	0	0		

Constraints

Name	Type	Columns	Initial Code	Notes
PK_ObjectType	Public	typeId		

Relationships

Columns	Association	Notes
typeId	1..* _MovingObject2Type. 1 ObjectType.	
typeId	1..* _Object2Type. 1 ObjectType.	

_MovingObject2Type

Database: MySql, *Stereotype:* «table», *Package:* Others

Detail: Created on 2/1/2007. Last modified on 3/7/2007.

Notes: Mapping: moving object --> types, with probabilities

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	movingObjectId	BIGINT	True	False	0	0	0		Pointer to entry in MovingObject table
False	typeId	SMALLINT	True	False	0	0	0		Pointer to entry in ObjectType table
False	probability	TINYINT	False	False	0	0	0	100	Probability that given MovingObject is of given type. Range: 0-100 (in%)

Constraints

Name	Type	Columns	Initial Code	Notes
FK_MovingObject2Type_MovingObject	Public	movingObjectId		
FK_MovingObject2Type_ObjectType	Public	typeId		

Relationships

Columns	Association	Notes
movingObjectId	1..* _MovingObject2Type. 1 MovingObject.	
typeId	1..* _MovingObject2Type. 1 ObjectType.	

_Object2Type

Database: MySql, *Stereotype:* «table», *Package:* Others

Detail: Created on 2/1/2007. Last modified on 3/7/2007.

Notes: Mapping Object --> types, with probabilities

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
False	objectId	BIGINT	True	False	0	0	0		Pointer to an entry in Object table
False	typeId	SMALLINT	True	False	0	0	0		Pointer to an entry in ObjectType table
False	probability	TINYINT	False	False	0	0	0	100	Probability that given object is of given type. Range 0-100 %

Constraints

Name	Type	Columns	Initial Code	Notes
FK_Object2Type_Object	Public	objectId		
FK_Object2Type_ObjectType	Public	typeId		

Relationships

Columns	Association	Notes
objectId	1..* _Object2Type. 1 Object.	
typeId	1..* _Object2Type. 1 ObjectType.	