Common Vocabulary

LSST Data Management

This document defines common vocabulary that should be used when naming columns in database schema and variables in transient classes. It also defines units and types.

Names for columns/attributes defining errors were omitted. To build them, append "Err" after columns' name (eg raErr, declErr). All error columns use the same units as the columns, for which the error is defined.

First moments see to be missing, should they be added?

A columns called *probability* have table-specific meaning, for example in PhotoZ table it means *probability that given object has a photo z.*

used name	unit	type	full name	comments
Position related				
ra	degrees	int64	right ascension	
decl	degrees	int64	declination	dec is a reserved word in most DBMSes
muRa	arcsec/year	double	derived proper motion	mu_alpha*cos(decl)
muDecl	arcsec/year	double	derived proper motion	mu_delta
uPosErrA	arcsec	float	Large dimension of the position error ellipse, assuming gaussian scatter	for u filter
uPosErrB	arcsec	float	Small dimension of the position error ellipse, assuming gaussian scatter	for u filter
uPosErrTheta	degrees	float	Orientation of the position error ellipse	for u filter
parallax		float	derived parallax for the object	
WCS related				
radesys		string(5)	Type of WCS used	Obsolete in ICRS
equinox		float	Equinox of the WCS	Obsolete in ICRS
ctype1		string(20)	Coordinate projection type, axis 1	
ctype2		string(20)	Coordinate projection type, axis 2	
crpix1		float	Coordinate reference pixel, axis 1	
crpix2		float	Coordinate reference pixel, axis 2	
crval1		double	Coordinate value 1 @reference pixel	
crval2		double	Coordinate value 2 @reference pixel	
cunit1		varchar(10)	X axis units	
cunit2		varchar(10)	Y axis units	
cdelt1		float		Obsolete by cd_xx terms?
cdelt2		float		Obsolete by cd_xx terms?
cd11		float	First derivative of coordinate 1 w.r.t. axis 1	
cd21		float	First derivative of coordinate 2 w.r.t. axis 1	

cd12		float	First derivative of coordinate 1 w.r.t. axis 2	
cd22		float	First derivative of coordinate 2 w.r.t. axis 2	
ra_ll	degrees	double	ra for the low-left corner	probably something more fancy needed
decl_ll	degrees	double	decl for the low-left corner	probably something more fancy needed
ra_lr	degrees	double	ra for the low-right corner	probably something more fancy needed
decl_lr	degrees	double	decl for the low-right corner	probably something more fancy needed
ra_ul	degrees	double	ra for the upper-left corner	probably something more fancy needed
decl_ul	degrees	double	decl for the upper-left corner	probably something more fancy needed
ra_ur	degrees	double	ra for the upper-right corner	probably something more fancy needed
decl_ur	degrees	double	decl for the upper-right corner	probably something more fancy needed
Time related				
dateObs		datetime	Date/Time? of observation start (UTC)	
taiObs		datetime	time of shutter open	international atomic time
mjdObs		double	MJD of observation start	
expTime		float	Duration of exposure for this particular element, eg Amplifier, CCD	
darkTime		float	Total elapsed time from exposure start to end of read	
taiDark		double	Time of shutter closed	during the exposure, if there was such an occasion; see Kem Cook for details. International atomic time. There also could be a situation when the shutter was closed and reopened multiple times during the exposure. In this case, a more complicated data structure is needed?
taiMidPoint		double	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.	
taiRange		float	If a DIASource corresponds to a single exposure, taiRange equals to exposure length. If DIASoure corresponds to multiple exposures, its taiRange equals to	

		end-of-last-exposure minus beginning-of-first-exposure.
earliestObsTime	datetime	Time of the first observation of given object
latestObsTime	datetime	Time of the last observation of given object
timeGenerated	datetime	Date/time when alert was generated

Observation related

zd		float	Zenith distance at observation mid-point	
airmass		float	Airmass value for the Amp reference pixel	preferably center, but not guaranteed
temperature	celsius	float		
wavelength		float	wavelength	
telAngle	degrees	float	Orientation angle of the telescope w.r.t sky	This is different from camera orientation w.r.t sky (encapsulated in WCS), since telescope is on alt-az mount
azimuth	degrees	float	Azimuth of observation	preferably at center of exposure at center of image and including refraction correction, but none of this is guaranteed
alt	degrees	float	Altitude of observation	preferably at center of observation at center of image and including refraction correction, but none of this is guaranteed
elevation	degrees	float	same as alt?	
zpt		double	Photometric zero point magnitude	

apDia	pixels	float	Diameter of aperture
photoFlam		float	Inverse sensitivity
photoZP		float	System photometric zero-point

PSF related

psf_nstar	int32	Number of stars used for PSF measurement	
psf_apcorr	float	Photometric error due to imperfect PSF model (aperture correction)	
psf_sigma1	float	Inner Gaussian sigma for the composite fit (XXX)	
psf_sigma2	float	Outer Gaussian sigma for the composite fit (XXX)	
psf_b	float	Ratio of inner PSF to outer PSF (XXX)	
psf_b_2G	float	Ratio of Gaussian 2 to Gaussian 1 at origin (XXX)	
psf_p0	float	The value of the power law at the origin (XXX)	
psf_beta	float	The slope of the power law (XXX)	
psf_sigmap	float	Width parameter for the power law (XXX)	
psf_nprof	float	Number of profile bins (XXX)	
fwhm	float	Effective PSF width	
sigma_x	float		
sigma_y	float		
posAngle	float		psf related
peak	float		psf related

x0	float		psf related
x1	float		psf related
chi2	float	Chi-square value for the PSF fit	

Magnitudes and shapes			
uMagnitude	double	magnitude (weighted average)	for u filter
uPetroMag	double	petrosian magnitude	for u filter
uApMag	double	aperture magnitude	for u filter

uApMag	double	aperture magnitude for u filter
psfMag	double	PSF magnitude of the object
apMag	double	Aperture magnitude
modelMag	double	Model magnitude (adaptive 2D gauss)

uIxx	float	Adaptive second moment	for u filter
uIyy	float	Adaptive second moment	for u filter
uIxy	float	Adaptive second moment	for u filter

fwhmA		float	Size of the object along major axis (pixels)
fwhmB		float	Size of the object along minor axis (pixels)
fwhmTheta	degrees	float	Position angle of the major axis w.r.t. X-axis
flux		float	Measured DIA flux for the source (ADUs)
snr	-	float	Signal-to-Noise ratio
ugColor		double	Precalculated color: difference between u and g)
grColor		double	Precalculated color: difference between g and r)
riColor		double	Precalculated color: difference between r and i)
izColor		double	Precalculated color: difference between i and z)
zyColor		double	Precalculated color: difference between z and y)

moment0	float	Sum of all flux of all pixels that belong to a source	placeholder
moment1_x	float	Center of light - x component	placeholder
moment1_y	float	Center of light - y component	placeholder
moment2_xx	float	Standard deviation about center of light - xx component	placeholder
moment2_xy	float	Standard deviation about center of light - xy component	placeholder
moment2_yy	float	Standard deviation about center of light - yy component	placeholder
moment3_xxx	float	Skewness of the profile - xxx component	placeholder
moment3_xxy	float	Skewness of the profile - xxy component	placeholder
moment3_xyy	float	Skewness of the profile - xyy component	placeholder
moment3_yyy	float	Skewness of the profile - yyy component	placeholder
moment4_xxxx	float	Kurtosis - xxxx component	placeholder
moment4_xxxy	float	Kurtosis - xxxy component	placeholder
moment4_xxyy	float	Kurtosis - xxyy component	placeholder
moment4_xyyy	float	Kurtosis - xyyy component	placeholder
moment4_yyyy	float	Kurtosis - yyyy component	placeholder

splitPercentage	%	int8	percentage of the split	all for a given source must add up to 100%

Redshifts		
redshift	float	Photometric redshift

photoZ1		float	
photoZ2		float	
photoZ1Outlier		float	
photoZ2Outlier		float	
probability		int8	Probability that given object has photo-z

Variability				
uAmplitude		float	amplitude of magnitude variations	for u filter
uPeriod		float	period of magnitude variations	for u filter
primaryPeriod		float	Average period across all filters	

uTimescale	days	float	timescale of flux variations	for u filter
uNumObs	-	int32	number of measurements in the lightcurve	for u filter
uVarProb	%	int16	probability of variability. 100% = variable object	for u filter

Calibration related				
bias		float	Bias level for the calibrated image	
gain		float	Gain value for the amplifier	
rdNoise	electrons	float	Read noise value	for this particular element, eg AmpExposure
sky		float	The average sky level in the frame	
skySig		float	Sigma of distribution of sky values	
u_fringeTime		datetime	Time when corresponding CMFringeExposure was processed	for u filter
u_flatTime		datetime	Time when corresponding CMFlatExposure was processed	for u filter

Image pixel array properties			
binX	int16	binning in X-coordinate	
binY	int16	binning in Y-coordinate	
sizeX	int16	Size of the image in X-direction (along rows; binned pixels)	Ignores overscan but includes regions that may be considered outside of the data portion of the image
sizeY	int16	Size of the image in Y-direction (along columns; binned pixels)	Ignores overscan but includes regions that may be considered outside of the data portion of the image
averPixelValue	float	average pixel value	
stdevPixelValue	float	standard deviation of average pixel value	

Rectilinear coordinates		
row	double	Pixel coordinate (Y) of the source centroid
col	double	Pixel coordinate (X) of the source centroid
cx	double	x-component of the (RA,Dec) unit vector
cy	double	y-component of the (RA,Dec) unit vector
cz	double	z-component of the (RA,Dec) unit vector

flags		
isProvisional	bool	

		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

uncategorized			
url	-	string	logical url of the corresponding FITS file
imagePStampURL		string(255)	Logical URL describing where the image postamp associated with the alert is located
templatePStampURL		string(255)	Logical URL of the postagestamp of the template image related to given alert
alertURL		string(255)	Logical URL to the actual alert sent
nCombine	-	int32	Number of images co-added to create a deeper image
probability	%	int8	Probability that given object is of given type
sizeRa		float	size of ra	this appears in postage stamp table
sizeDecl		float	size of decl	this appears in postage stamp table

mops related				
a		float	semi-major axis of the orbit (AU)	
incl	degrees	float	inclination of the orbit	
e		float	eccentricity of the orbit	
periTAI		float	TAI of the perihelion passage (comets)	
periDist		float	Perihelion distance (AU)	
omega		float	argument of perihelion	
node		float	longitude of the ascending node	
meanAnom		float	mean anomaly of the orbit	
qual		float	measure of the accuracy of the derived orbit, classification, etc.	can be more than one. Placeholder

various ids			
alertId	-	int32	Id of an Alert
amplifierId	-	int16	Id of an Amplifier
ccExposureId	-	int64	Id of CCD Exposure
filterId	-	int8	Id of a Filter
objectId	-	int64	Id of an Astronomical Object
movingObjectId	-	int64	Id of a Moving Object
visitId	-	int32	Id of a Visit
flatExposureId	-	int32	Id of a Flat Exposure
biasExposureId	-	int32	Id of a Bias Exposure
darkExposureId	-	int32	Id of a Dark Exposure
cmFlatExposureId	-	int32	Id of a Calibrated Master Flat Exposure
subtractedExposureId	-	int32	Id of a Subtracted Exposure
varianceExposureId	-	int32	Id of a Variance Exposure