DRAFT

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Domain Glossary

Domain Model

Term	Base Class	Description
Alert		
AstroObject		A representation of an astronomical object, in particular its astrophysical properties as derived from analysis of the **Sources** that are associated with it.
AstroObjectCatalog	**Catalog**	
Astrometric Model		A physical model that fits the **Position Curve** of an **AstroObject.** This can be simply parallax and proper motion, but might have binary orbit parameters as well.
Astrometric Standard	**AstroObject**	
Astrometric Standards Catalog	**AstroObjectCatalog**	
Atmosphere		The aggregation of all available information that describes the physical state of the atmosphere above the observatory at a given **Time**, or range of **Times**.
Atmosphere Catalog	**Catalog**	A collection of atmospheres, indexed by **Time**.
Atmospheric Measurements		An aggregation of all available measurements that pertain to an **Atmosphere.**
Atmospheric Model		
Atmospheric Numerical Model		A numerical model of the atmosphere, such as a MODTRAN model, which gives physical properties as a function of spatial position, and can generate extinction and emission as a function of wavelength for any altitude and azimuth.
Atmospheric Sounding		A measurement of a group of atmospheric parameters as a function of height. Can be generated from a radiosonde or from satellite observations.
Aux Telescope Spectrum		A spectrum (flux vs wavelength) of a **Spectral Standard** taken with the Observatory's Auxiliary Telescope.
Background Model	**Surface**	A **Surface** which specifies the sky background in the **Exposure** as a function of **Pixel Coordinates** (or possibly **Focal Plane Coordinates**?)
CCD	**Monolithic Detector**	A maximal **Monolithic Detector**, possibly with multiple

		Segments read out in parallel by the camera electronics.
Catalog		
Clipboard		
Coadd Component		
Coadded Exposure	**Exposure**	An **Exposure** which has been produced from a set of **Exposures** by resampling each to a common **Sky Projection** and adding the pixels with a coaddition algorithm.
CoordinateTransform		A **Function** that maps coordinates in one two dimensional space to those of another.
Crosstalk Correction Matrix		
DIA Source	**Source**	A **Source** measured in a difference image
DIA Source Catalog	**Source Catalog**	
Defect Map		The **Defect Map** is a catalog of defective pixels in the **Detector**, categorizing the type of defect as one of *Hot, Dead, Trap,* or *Bad Column*
Detection Set		
Detector		A two dimensional surface capable of imaging, that is recording incident photon flux in an array of pixels.
Difference Exposure	**Exposure**	An **Exposure** created from the difference of a **Calibrated Exposure** and a **Template Exposure**
Discontinuity Mask	**Mask**	A **Mask** associated with a **CCD**. It has four mask planes: X-, X+, Y-, Y+. If a pixel has the X- plane set, the corresponding **CCD** pixel has a geometrical discontinuity with the pixel in the negative X direction. Similarly for X+ (positive X), Y- (negative Y), and Y+ (positive Y) planes.
Electrical Geometry		The **Electrical Geometry** specifies the order in which the **Segment** pixels are read out, including not only the physical imaging pixels, but also the overscan pixels that can be located before and/or after each row of physical pixels.
Ephemerides	**Time Series**	A **Time Series** of predicted **Sky Coordinates** for a **Solar System Object.**
Exposure		One or more **MaskedImages** in association with a variety of classes that add further information associated

		with the history of the **MaskedImage** (**Observation MetaData),** or derived through processing the **MaskedImage**, eg **WCS**, **Background Model.**
Exposure CCD Group		
Exposure Catalog	**Catalog**	
Exposure Stack		A set of associated **Exposures.** If taken of the astronomical sky, all are associated with the same **Image Tile.** In this case, each **Exposure** is expected to overlap with the **Sky Region** of the **Image Tile**.
FPAExposure	**Exposure**	The **FPAExposure** is to a full **Focal Plane Array** (FPA) what an **Exposure** is to a single element of an FPA. It aggregates the **Exposures** of all, or a subset of, the imaging elements of the FPA. Additionally, it may have FPA spanning representations of the **WCS** and **PSF**.
Focal Plane Array	**Detector**	An array of **CCDs** in the focal plane of the telescope, read out together by the camera electronics.
Footprint		The set of pixels that are determined to be part of the Source
Gray Extinction Surface	**Surface**	A **Surface** which specifies the gray extinction within an **Exposure** as a function of **Pixel Coordinates** (or possibly **Focal Plane Coordinates**?)
IR Cloud Camera Images		Images of the sky over the Observatory taken by a camera sensitive to the thermal infrared.
Illumination Correction	**Processed Exposure**	
Image		A 2D array of pixels
Image Plane Coordinates		coordinates in an ideal image plane, for example a tangent plane
Image Subtraction Standards Catalog	**AstroObjectCatalog**	
Image Tile		A **Sky Tile** together with the **Sky Projection** that defines the projection of the **Sky Tile** onto the image plane.
Imaging Region	**Bounding Box**	
Instrument Model		Contains all information required to convert a photon flux in a ray from given angular coordinates wrt the camera optical axis into ADU counts/sec in the corresponding pixels.
Light Curve	**Time Series**	A **Time Series** of magnitude or flux in a given

		Observing Filter vs **Time**
Mask		A three dimensional array of bits, arranged as a stack of two dimensional **Mask Planes**. When a **Mask** is associated with a compatibly sized **Image**, each plane idenitifies the per-pixel presence or absence of a particular condition in the associated **Image**.
Mask Plane		One bitplane of a **Mask**
MaskedImage		A **MaskedImage** contains an **Image**, a **Variance Image**, and **Mask**, all with the same pixel dimensions. The **Variance Image** pixel value gives the estimated variance in the pixel value of the corresponding pixel of the **Image**. The **Mask** pixel value is interpreted as a stack of bits, each of which describes some property of the corresponding **Image** pixel, with semantics given by the definitions of the associated **Mask Planes**.
Master Bias Exposure	**Raw Exposure**	
Master Flat Exposure	**Processed Exposure**	
Master Fringe Exposure	**Processed Exposure**	
Monochromatic Domeflat	**Exposure Stack**	
Monolithic Detector	**Detector**	A **Detector** which is associated with a monolithic substrate. This implies that the geometric relationships between pixels are fixed over the life of the **Detector**.
Non-Gray Extinction Curve	**Function**	A **Function** which gives the non-gray extinction of the **Atmosphere** as a function of wavelength, and possibly of elevation and azimuth.
Object Classification		The Object Classification assigns an AstroObject to one or more types, such as variable star, Cepheid, supernova, spiral galaxy. The type assignment may have an associated probability, and/or parameters that quantitatively refine the type, for example the temperature of a main sequence dwarf star.
Observation Metadata		Information that specifies the condition of the telescope, camera, and the environment, when the associated **MaskedImage** was acquired.
Observing Filter		The wavelength-dependent filter placed in front of the **Focal Plane Array** during the **Exposure**
Orbit		A six parameter set of orbital elements, and associated covariance matrix, that specifies the orbit of a **Solar System Object**

Overscan Function	**Function**	- overscan parameters (mean, median, clipped, etc) - type of Function * If Image, collapse down to 1-d (mean, median, mode, etc) * If Function, fit for Function Note: Use spline or polynomial fit along overscan region (want a slowly varying function). For the 1-D representation Pan-STARRS determines the input values to the fit as representatrions on the coordinate along the overscan, with the statistic derived from the pixels in the perpendicular direction at each location. Sigma-clipping on input data is a necessary option. May need to reject several columns of overscan ramp.
Overscan Region	**Bounding Box**	
PSF		The **PSF** is a representation of the point spread function as a function of position in the associated **MaskedImage**. Mathematically, the **PSF** will be represented by a **Kernel**. This allows the **PSF** to be generated at any desired point within the **MaskedImage** extent. In addition, the **PSF** needs to include convenient summary info, like FWHM and ellipticity.
PSFStandardsCatalog	**AstroObjectCatalog**	
Peak		A localized maximum in the **Footprint** of a **Source**
Photometric Standard	**AstroObject**	An **AstroObject** (usually a star) utilized for photometric calibration. It has been determined to be non-variable, and optionally has an associated **SED**
Photometric Standards Catalog	**AstroObjectCatalog**	
PhotometricCalibration		The **Photometric Calibration** is a bidirectional mapping between instrumental magnitude and calibrated magnitude. A variety of mappings is possible, including ones that are spatially dependent and nonlinear. For the nightly processing pipelines, a zero point probably suffices.
Physical Geometry	**CoordinateTransform**	A **Coordinate Transform** between a **Detector's Pixel Coordinates** and **Focal Plane Coordinates.**
Pipeline		
Pixel Coordinates		coordinates in pixel space within a **Monlithic Detector**
Position Curve	**Time Series**	A **Time Series** of **Sky Coordinates** vs **Time**
Processed Exposure	**Exposure**	An **Exposure** which has been transformed from a **Raw**

		Exposure to a pixel format that includes only the imaging pixels. The processing will generally include removing the instrumental signature and adding exposure components such as a **WCS** and **PSF**.
Provenance		
Pupil Ghost Exposure	**Processed Exposure**	
Raw Exposure	**Exposure**	An **Exposure** whose pixel format is that of the raw detector readout, including overscans
SDQA Alert	**Alert**	
SDQA Data Archive		
SDQA Metric		
SED		Arbitrarily normalized flux as a function of wavelength.
Scattered Light Model		
Science Data Archive		
Segment	**Monolithic Detector**	A region of a **CCD**, read out into a data stream separate from those of other **Segments**. A **Segment** has a fixed geometrical relationship to the other **Segments** in the same **CCD**.
Shutter timing	**Time Series**	The **Shutter Timing** contains two **Functions**. The first specifies the **Focal Plane Coordinates** of the edge of the shutter as a function of Time during shutter opening. The second gives the same map during shutter closing.
Sky Coordinates		Coordinates in an ra, dec system.
Sky Projection	**CoordinateTransform**	A function which maps **Sky Coordinates** onto **Image Plane Coordinates**.
Sky Region		An arbitrary polygonal region of the sky. A **Sky Region** contains all the **Sky Tiles** from a **Sky Tessellation** that have an overlap with the region.
Sky Tessellation		A regular partitioning of the spherical surface of the sky into **Sky Tiles**
Sky Tile		An element of a **Sky Tessellation**. A **Sky Tile** may contain other **Sky Tiles** in a hierarchical way. An example of this would be HTM
Solar System Object	**AstroObject**	
Solar System Object	**AstroObjectCatalog**	

Catalog		
Source		A representation of the measurements done on a group of pixels in an Exposure
Source Catalog	**Catalog**	
Source List		
Spectral Standard	**AstroObject**	An **AstroObject** with an accurately known **SED**, intended as an observing target of the Auxiliary Telescope.
Spectral Standards Catalog	**AstroObjectCatalog**	
Template Exposure	**Coadded Exposure**	A **Coadded Exposure** intended for use in Image Subtraction. It will typically be created by coadding some number of **MaskedImages** with appropriate outlier rejection to eliminate cosmic rays and astrophysical transients.
Template Exposure Catalog	**Exposure Catalog**	
Tracklet		
Transient Alert	**Alert**	
Transient Alert Catalog	**Catalog**	
Variance Image	**Image**	An **Image** whose pixel values are interpreted as the variance in the pixel values of an associated identically sized **Image**
Visit		
WCS	**CoordinateTransform**	A function which maps **Sky Coordinates** to **CCD Coordinates** and vice versa. It may or may not comply with the WCS standard.
Domain Model - Object View		
Domain Model - Source View		
Reverse Engineered - AFW/Detection		
Reverse Engineered AFW/Image		

Mask Planes

Term	Base Class	Description
Bad Pixel Mask	**Mask Plane**	
Cosmic Ray Mask	**Mask Plane**	
Mask Plane		
Satellite Trail Mask	**Mask Plane**	
Saturated Pixel Mask	**Mask Plane**	

Pipelines

Term	Base Class	Description
Alert Production	**Production**	
Association Pipeline	**Pipeline**	
Astrometric Calibration Pipeline	**Pipeline**	
Calibration Products Production	**Production**	
Catalog Data Release Production	**Production**	
Day MOPS Pipeline	**Pipeline**	
Deep Detection Pipeline	**Pipeline**	
Detection Pipeline	**Pipeline**	
ISR Pipeline	**Pipeline**	
Image CoAddition Pipeline	**Pipeline**	
Image Data Release Production	**Production**	
Image Subtraction Pipeline	**Pipeline**	
Night MOPS Pipeline	**Pipeline**	
Object Classification Pipeline	**Pipeline**	
Photometric Calibration Pipeline	**Pipeline**	
Production		
SDQA Pipeline	**Pipeline**	
Stage		
WCS Pipeline	**Pipeline**	
Policy Subtypes		

SDQA Metrics

Term	Base Class	Description
Atmospheric Seeing	**SDQA Metric**	
Delivered Seeing	**SDQA Metric**	
Median Delivered Seeing	**SDQA Metric**	
SDQA Flags		
SDQA Summary Metric	**SDQA Metric**	
SDQA Threshold		

Policy Subtypes

Term	Base Class	Description
Alert Pipeline Policy	**Policy**	
Alert Policy	**Policy**	
Association Policy	**Policy**	
Astrometric Calibration Policy	**Policy**	
Bias Correction Policy		
CoAdd Policy	**Policy**	
Cosmic Ray Detection Policy		
Crosstalk Correction Policy		
Dark Current Correction Policy		
Data Release Policy	**Policy**	
Dataset Specific Policy		
Day MOPS Policy	**Policy**	
Deep Detection Policy	**Policy**	
Defringe Policy		
Detection Policy	**Policy**	
Flat Field Correction Policy		
Geometric Distortion Correction Policy		
ISR Policy	**Policy**	
Illumination Correction Policy		
Image Data Ingest and Transform Policy	**Policy**	
Image Subtraction	**Policy**	

Policy

Linearization Policy

Mask and Correct Additional Artifacts Policy

Night MOPS Policy **Policy**

Object Classification Policy **Policy**

Overscan and Trim Policy

Photometric Calibration Policy **Policy**

Policy

Pupil Image Correction Policy

SDQA Policy **Policy**

Saturation Correction

Template Image Policy **Policy**

Visualization Image Policy **Policy**

WCS Policy **Policy**

ISR Policy Subtypes

Math Objects

Term	Base Class	Description
Analytic Representation		
Bounding Box		
Function		
Histogram		
Kernel		
Least Squares System		
Pixel Representation		
Shape Model		A parametric approximation to the shape of an **AstroObject.** A **Shape Model** may apply only to a single **Observing Filter**
Surface		
Time Range		
Time Series		