Gen3 Obs Packages: Metadata Translation

LSST

Large Synoptic Survey Telescope

What Has Gone From Gen2?

- No Mapper class
- No bypass system; all calibrations are ingested in to the repository.
- Filename templates no longer needed per dataset type
    - The template can include optionals and the dataset type itself
- No longer separate data models for each camera.
- ParseTask metadata extraction is retired and replaced by astro_metadata_translator

Metadata Translation

astro_metadata_translator

- Standalone metadata translation infrastructure.
- No dependency on LSST software
    - Uses Astropy class for quantities, coordinates and locations.
- `pip install astro_metadata_translator`
- GitHub: https://github.com/lsst/astro_metadata_translator with BSD license.
- Some documentation: https://astro-metadata-translator.lsst.io

astro_metadata_translator is a core component of Gen 3 raw data ingest and Exposure VisitInfo creation.

ObservationInfo and MetadataTranslator

- ObservationInfo constructor takes a dict-like header (PropertyList or astropy.io.fits), determines the relevant MetadataTranslator class, and populates the result with translated values.
- By default supports HSC, DECam, MegaPrime, SDSS imaging.
- Pluggable architecture
  - Translator subclasses register automatically with the core translation system.
  - LSST translators (LATISS, lsstCam, test stands) currently live in obs_lsst but plan is to relocate them when they stabilize.
- Can automatically apply corrections to headers (if observation_id and instrument are known and a correction has been registered).
- Also helper routine to merge multiple headers.

Example: DECam

```
$ translate_header.py $TESTDATA_DECAM_DIR/rawData/raw/raw.fits
Analyzing testdata_decam/rawData/raw/raw.fits...
instrument: DECam
telescope: CTIO 4.0-m telescope
datetime_begin: 2013-09-01T06:02:55.754
altaz_begin: <AltAz Coordinate (obstime=2013-09-01T06:02:55.754, location=(1814299.43217096, -5214321.09237828, -3187415.56248863) m,
    pressure=0.0 hPa, temperature=0.0 deg_C, relative_humidity=0.0, obswl=1.0 micron): (az, alt) in deg
    (61.24, 39.54)>
boresight_airmass: 1.57
boresight_rotation_angle: 90.0 deg
boresight_rotation_coord: sky
dark_time: 201.15662 s
datetime_end: 2013-09-01T06:07:56.000
detector_exposure_id: 22938825
detector_group: S
detector_name: 1
detector_num: 25
detector_serial: S3-111_107419-8-3
detector_unique_name: S1
exposure_id: 229388
exposure_time: 200.0 s
location: (1814299.43217096, -5214321.09237828, -3187415.56248863) m
object: DES supernova hex SN-S1 tiling 22
observation_id: ct4m20130901t060255
observation_type: science
physical_filter: z DECam SDSS c0004 9260.0 1520.0
pressure: 779.0 hPa
relative_humidity: 23.0
science_program: 2012B-0001
temperature: 11.9 deg_C
tracking_radec: <SkyCoord (FK5: equinox=J2000.000): (ra, dec) in deg
    (42.81995833, -0.00158306)>
visit_id: 229388
```

Writing A Translator

- Create a class for each instrument.
- You can inherit from another instrument translator if your new instrument is broadly similar to another.
- Each registered translator is asked whether it understands the supplied header.
- Translator method for each attribute in ObservationInfo.
- Some methods can be auto generated:
  - Can specify constant translations (e.g. telescope location)
  - One to one mappings: FILTER -> physical_filter