VERA C. RUBIN OBSERVATORY

DIA Transient+Variables Work Planning

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Next Work: What and Who: 3-6 months: 1/2

- Run pre-cursor data
  - Define datasets: small, medium, and large
  - What is a truth catalog for real data to determine efficiency?
- Define and curate some source injection catalogs
  - Basic testing
  - Think about N, density.
  - Density: Using, not using sources. When do fakes obscure sources to match.
  - Host separation, surface brightness, extended vs. point-source variability
  - Partially-resolved sources: strong lensing
  - Treatment of noise in injection
- Define pipeline runs (YAMLs)
  - One run through to PVI
  - Inject onto PVI (and not raw)
  - Then from that RUN/COLLECTION build different options.
- Instrument single-frame DIA processing
  - analysis_ap, analysis_tools

Next Work: What and Who: 3-6 months: 2/2

- Define configuration parameter spaces to explore
- Study building templates in different ways
- ?Nightly Coadds?
- Are Flags in different datasets being determined correctly/consistently
  - DC2, HSC, DECam
  - Different measurement config parameters?
- Understand measurement and flags of negative DIA sources
- Validate A&L Decorrelation and resulting SNR
- Try 1-2 "new" subtraction techniques: new bases, source selection
- AuxTel?
  - Important for AP as integration target. Less obvious that it's the focus on DIA algorithms
  - But could be fun!? Operation things.

Next Work: What and Who: 6-12 months:

- ?Association
  - Recovery, Uniqueness
  - Strong Lensing == partially-resolved sources
- What should a difference "image" look like? What should we display? Detection image, measurement image, +masking? This visual is important for conveying accurate impression
- Is there an analysis "rotation" that would better represent our best knowledge of the changes in the sky in a simple 2D array that would be better than what we're doing now.
- Is there a better DIASrc table that helps simplify discussion and AP workflow?
- Build out rich interactive methods to analyze individual DIA (e.g., Maya Guy, IN2P3)
- Complement with large-scale metrics (scalars, vectors, plots) for large runs
- reliability, Real/Bogus? We didn't talk about today, but work is happening.

Next Work: What and Who: 12-18* months:

- Running on real LSSTCam data
- Quick response and feedback. Scaling.
- Building templates
- Identify a plan to best yield high purity. How should we be conservative in masking of edges, bright source, saturated regions, etc. while providing reasonable efficiency. This interacts with template building.

Next Work: Beyond the Baseline

- Work "we" might start soon but won't expect to be deployed for awhile
- Night coadds: on a path toward acceptance
- Cell-based templates and subtractions
  - Theoretically great. A bookkeeping ~~nightmare~~ "opportunity for learning and growth"
- Subtraction-free CNN-based detection+measurement
- Other methods