



Alert Production Status Update

Ian Sullivan | DMLT vF2F | June 8, 2022



Alert Production overview



Staffing updates

- Nima Sedaghat has moved to Seattle and been officially hired as a postdoc at UW
- We are attempting to hire Bruno Sanchez as a postdoc at the University of Marseille through a contract between AURA and IN2P3, starting in September
- Brianna Smart will move to Seattle and start as a Research Scientist in August
- Hiring Erin Howard as a Research Assistant in August

Review of recent progress - Alert Production F22A



- **Integration 02C.03.08**

- John and Krzysztof completed the [Prompt Processing sprint](#), resulting in a working prototype on GCP

- **Image differencing algorithms 02C.03.04**

- New image differencing Task now available:
 - Former ImageDifferenceTask now three separate Tasks:
 - `lsst.ip.diffim.getTemplate`
 - `lsst.ip.diffim.subtractImages`
 - `lsst.ip.diffim.detectAndMeasure`
 - Greatly simplified interface, with much better unit test coverage

Review of recent progress - Alert Production F22A



- **Infrastructure 02C.03.05**

- Added metrics for attributions of known Solar System objects to Chronograf
- Investigated the non-processing AP pipeline overhead
- Expanded documentation and fixed documentation build errors
- Refactored the AP and AP with Fake sources pipelines

- **Data analysis and QA 02C.03.04**

- Regularly processing both DECam HiTS and HSC COSMOS in CI
- Investigated and fixed DECam ISR failures
- Fixed Fake source completeness metrics in CI

Review of recent progress - Alert Production F22A



- **Solar System Processing (formerly known as MOPS) 02C.03.06**

- Updated measurement uncertainties for trailed sources
- Added trailed source Fake injection
- Conducted the successful Data Exchange Challenge 2 with the Minor Planet Center
- Extended Heliolinc capabilities to interstellar objects
- Sped up cluster computation in Heliolinc

Plans for F22B and beyond - Alert Production



- **Integration**
 - 2 week sprint for John and Krzysztof to assist in deploying Prompt Processing for Auxtel observing
- **Pipeline infrastructure 02C.03.05**
 - Pipeline reorganization following RFC-775
 - Add and improve AP metrics from CI
 - Continue pipeline performance characterization and tuning
 - After the AP pipeline is properly configured, perform line profiling to identify code for optimization

Plans for F22B and beyond - Alert Production



- **Image Differencing 02C.03.04**

- Conversion of our pipelines to use the new image differencing
- Fully support detection and measurement using maximum likelihood images
- Evaluate performance of dipole fitting in ip_diffim
- Compare image differencing when convolving the template / the science image and evaluate whether we can claim [DM-AP-12](#)

- **Alert Distribution 02C.03.03**

- Brianna Smart will work on resurrecting Spencer Nelson's Alert Distribution Service when she starts in August

Plans for F22B and beyond - Alert Production



- **Data Analysis and QA 02C.03.04**

- Add DC2 dataset to CI
- Regular analysis of processing of DECam and HSC data through AP pipelines
- Testing and verification of image differencing pipeline configurations on DECam, HSC, and DC2 datasets
- Implement streak detection and masking in AP
- Expand the analysis_ap package
- Revisit DCR mitigation

Plans for F22B and beyond - Alert Production



- **Solar System 02C.03.06**

- Design and build an interface between the APDB and the Solar System Processing pipeline
- Complete the Heliolinc-based Orbit Determination algorithm
- Wrap makeTracklet and Heliolinc code as python PipelineTasks

- **Infrastructure for Real/Bogus 02C.03.04**

- Train and test a Real/Bogus classifier using DC2 data on the IDF
- Train and test the classifier on precursor data
- Build a flexible prototype that supports traditional real-bogus classification as well as more advanced models