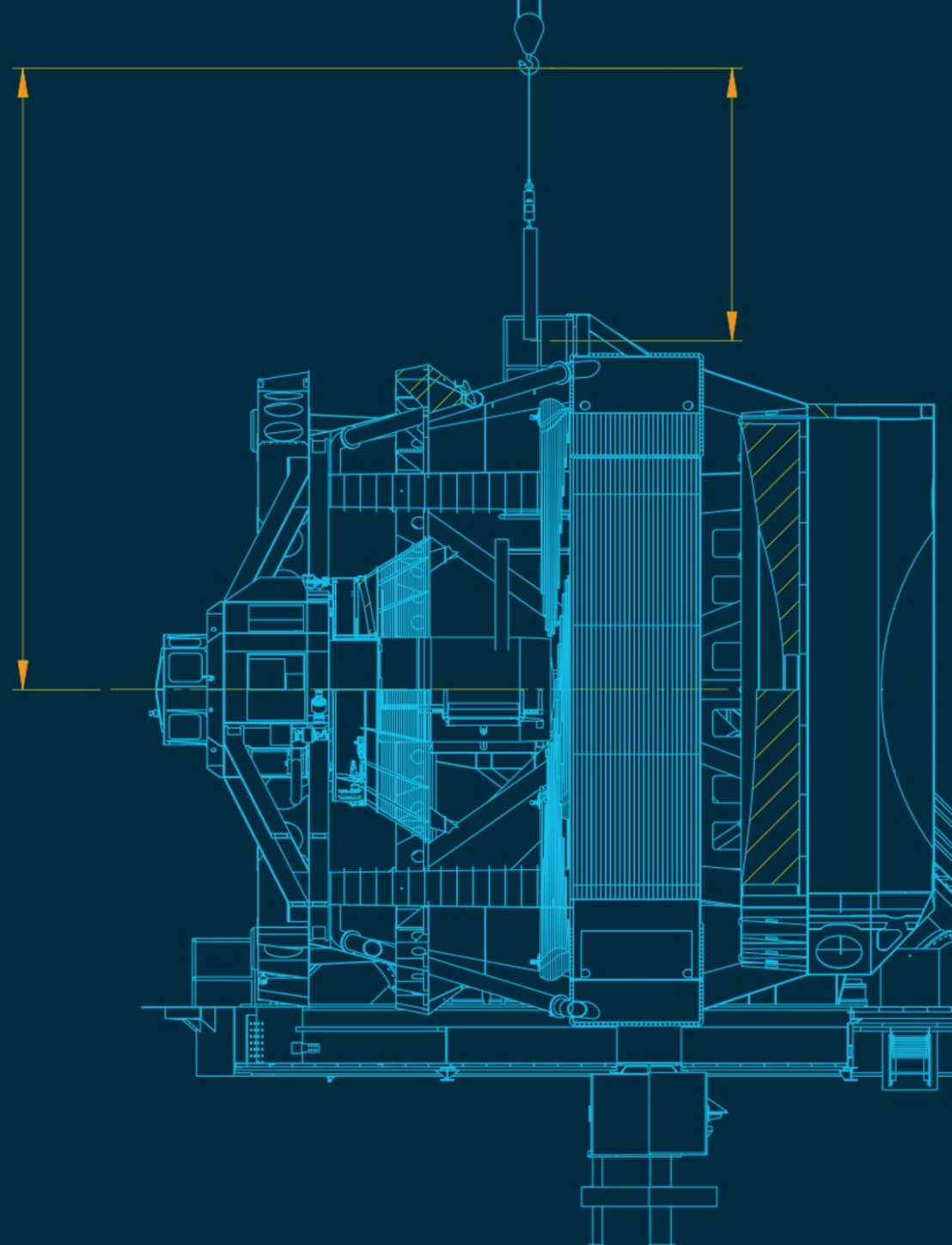
Alert Production

May 2020

Rubin Observatory

LSST

Legacy Survey of Space and Time



Review of recent progress

- **Gen 3 porting**
  - The bulk of AP pipeline code is now operational in the Gen 3 middleware.
  - Testing is not yet complete, due to difficulties in data wrangling.
    - Simply loading DECam data to Gen3, getting ISR to run on it, etc, was more challenging than anticipated.
    - But did result in a system for converting Gen 2 to Gen 3 repositories.
- **Fake Object insertion**
  - Adapted from the tooling produced by Sophie Reed for DRP.
  - Used in preparation for the algorithms workshop.
  - Work remains to “productise” this in the next couple of months.

Review of recent progress

- **Alert Generation**
  - The AP system now actually generates alerts (that is, descriptions of transients and variables serialized to Avro).
  - ...well, mostly. Prototyped this capability in advance of the Algorithms Workshop; pipeline implementation is currently in progress.
- **Alert Distribution**
  - Onboarded Spencer Nelson (co-hire with ZTF & SCiMMA)
  - Alert Stream Simulator (see DMTN-149) for distribution to Community Broker authors in “internal demo”; expect it to be ready shortly.

Review of recent progress

- **Image Differencing**
  - Rewrote decorrelation “afterburner”, resolving bugs (bad padding).
  - Started holding (semi-) regular telecons with Robert Lupton to provide extra guidance on algorithmic issues.
- **Solar System Processing**
  - Completed “HelioLinc2” implementation: our (improved) implementation of the Holman et al. linking algorithm
  - Demonstrated end-to-end processing using HelioLinc2 and other Rubin code of a realistic solar system dataset (in notebook, rather than pipeline, form).
  - RFC-620 *finally* converged.

Plans for the F20A cycle

- **Gen 3 porting**
  - Wrap up remaining loose ends; make sure we have ap_verify running complete pipelines in CI based on Gen3 middleware.
- **Fake Object Insertion**
  - Make the current prototype a core part of regular pipeline testing.
  - This involves cleaning up and integrating the existing code, and extensions to:
    - Position fakes relative to known objects;
    - Vary positions of fakes on the sky;
    - Improve book-keeping regarding which fakes have been inserted.
  - Ultimately, this will be running automatically in CI.

Plans for the F20A cycle

- **Alert Generation**
  - Complete integration of alert generation with pipelines.
  - Augment to include cut-out images (requires some negotiation about format).
- **Alert Distribution**
  - Get the Alert Stream Simulator into the hands of Community Broker teams.
  - Ensure it's packaged with appropriate alert data, including solar system data.
  - Engage with the Data Facility team to understand how the Alert Distribution system will ultimately be deployed.

Plans for the F20A cycle

- **Image Differencing**
  - Rewrite ZOGY code to incorporate the same fixes as were made to the decorrelation afterburner.
  - Incorporate spatially varying PSF and correction to the decorrelation afterburner.
  - Continue to engage with Robert!
- **Solar System Processing**
  - Get RFC-620 changes LCRed.
  - Write up HelioLinc2 for publication, and continue to push on algorithmic issues (in particular, completeness with respect to MOPS).
  - Prepare simulated solar system data products catalog.

Plans for the F20A cycle

- **Jointcal**
  - Add support for proper motions and parallaxes.
  - Initially just reading from the catalog and applying; ultimately, fitting.
- **Testing & QA**
  - Incorporate HSC data into regular reprocessing and analysis efforts.
  - Reach out to the Data Facility to see if we can automate reprocessing à la HSC RC2.
  - Complete work to generate DECam calibration products using Rubin code.
  - Push on understanding DECam ISR & calibration products.

Calibration Products Production

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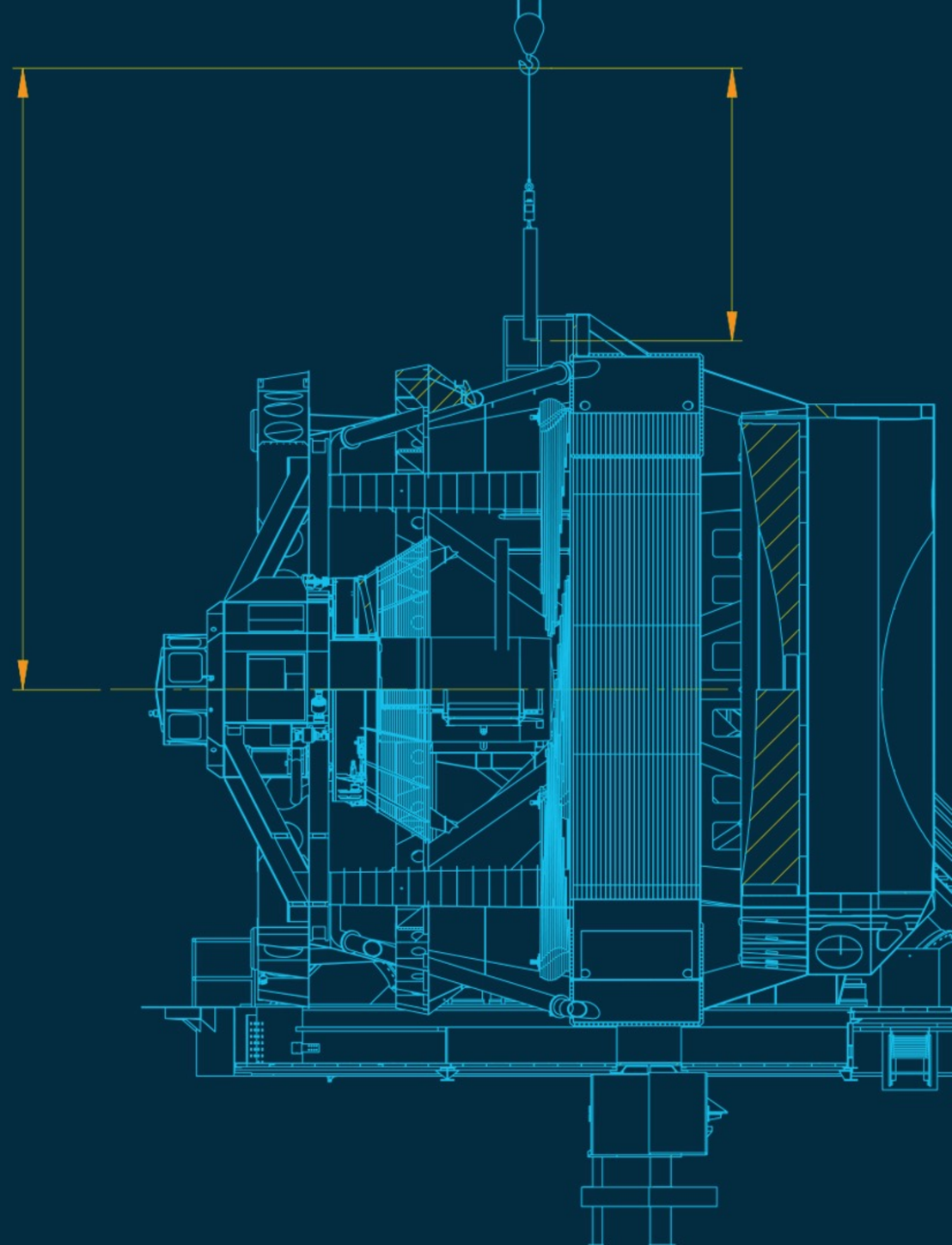

Current activities

- **AuxTel processing**
  - Shepherding data taken with AuxTel earlier this year through prototype DM pipelines.
  - This requires specializing existing pipelines to work with the AuxTel data, and further integration of the “Spectractor” package.
- **Calibration product management**
  - Produced DMTN-148.
  - Working our way through existing code and modernizing/updating it to fit this model.
  - Developing CI package (“ci_cpp”) to guard against regressions.

Current activities

- **Detector effects**
  - Algorithmic improvements and validation to defect identification, crosstalk correction, linearity correction.
  - Engaging with Camera team (Eric Charles) to look for discrepancies between ip_isr and eotest.