

HST INS Work Item Data Sheet

1. SI/Title: ACS/PSF Spatial and Temporal Variability (Study)
2. INS Lead: K. Sembach (tentative contact until lead within INS is identified)
3. Description of Work:

Study the effort required to determine corrections for the PSF shape variations seen in the imaging instruments' focal plane arrays. This correction would include the effects of OTA breathing as well as instrumental variations.
4. Schedule Constraints and Dependencies:

The work of determining and implementing corrections may require an ACS time-dependent CTE correction, which is described on a separate work item sheet.
5. Risks and Open Issues:

Risk – Previous efforts to provide significant solutions in this area have been conducted, with better understanding of limitations resulting, but only limited gains in available calibrations.

Adequate information on the state of HST influencing PSF changes may not be available to allow fully predictive models, even a posteriori.

A formal PSF variability analysis effort will likely require a substantial effort akin to that required for the implementation of MultiDrizzle.
6. Priority: High
7. Priority Justification:

In many ways HST supplies stable observing conditions far superior to those achievable from the ground. However, the low-Earth orbit contributes to significant variations of the PSF that can be major analysis challenges, if not limiting factors for the success of forefront science programs. The clearest example for PSF variability is weak-lensing applications where statistical study of subtle background galaxy shapes is required. Since this is a prime science application, it is necessary to scope out the required effort as soon as possible, including assessment of whether additional calibrations are needed for Cycle 15.
8. Resources (including estimated calendar duration for each portion):
 - a. Requirements
ACS Instrument Scientists (0.25 FTE)
 - b. Development
N/A
 - c. Testing
N/A
9. Documentation and Deliverables:

Project Plan Document (TIR?)

TIR or white paper, which will include both a recommendation for any necessary calibration observations required to implement the time-dependent corrections and a high-level overview of the science that would benefit from implementation of these corrections.