

Parallels Post-SM4

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Parallels

- Parallel observations offer a chance to increase the science productivity of HST
- Operate one or more instruments in conjunction with the prime science instrument
 - **“Coordinated” Parallels**
 - Parallel is part of prime science investigation proposed and approved in Phase I
 - Parallel specification is given by GO as part of Phase II proposal
 - Parallel and prime exposures/visits are specified together in same proposal
 - **“Pure” Parallels**
 - Parallel is proposed in Phase I as part of standalone parallel science program
 - Parallel specification / description is given by GO in Phase II
 - Parallel and (unrelated) prime visits are matched at this stage through iterative process

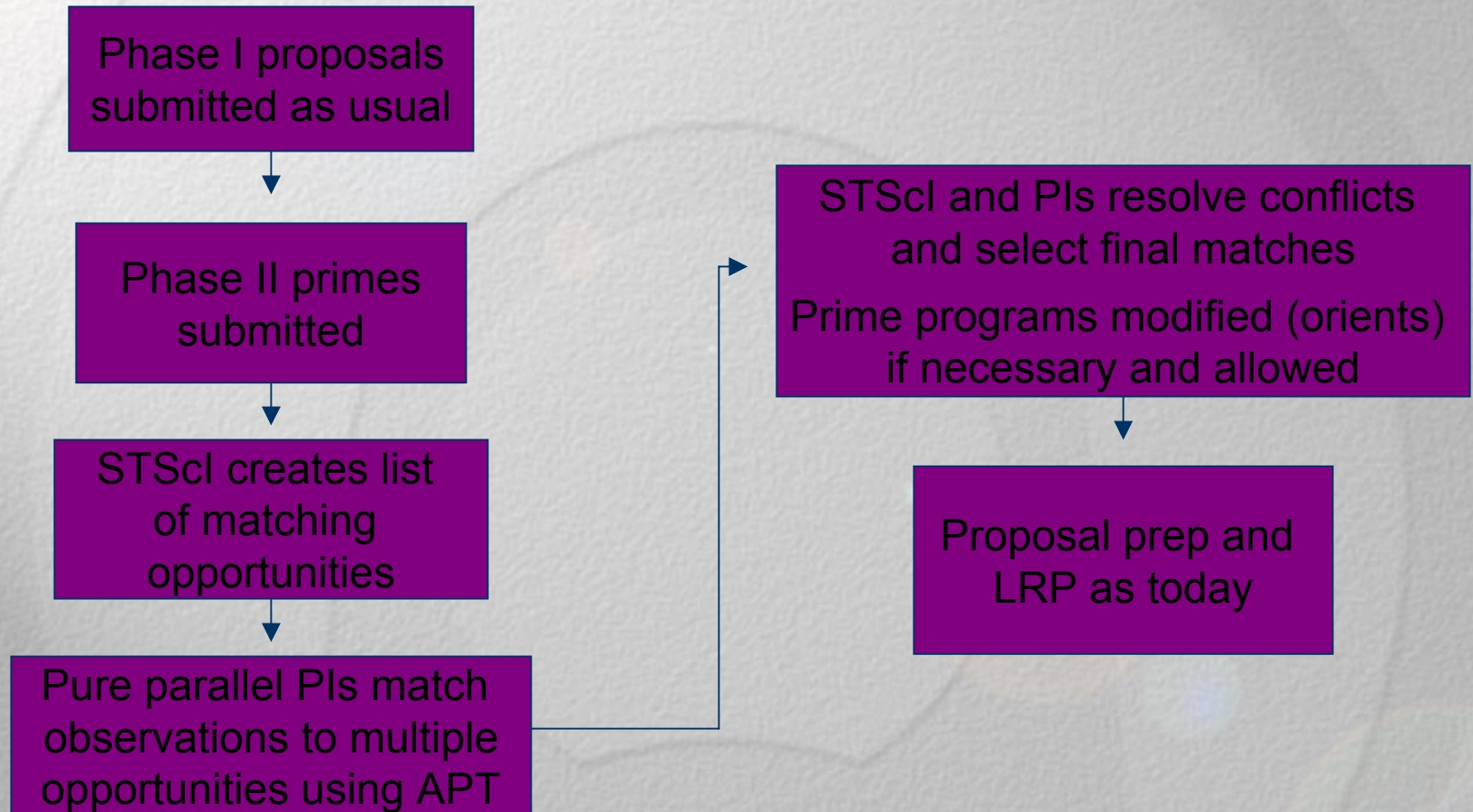
Maximizing Pure Parallel Science

- Existing implementation is less efficient than desired
 - Visits matched late in scheduling process (after primes are scheduled)
 - Doesn't always work (no chance for iteration)
 - Rigid visit structure/specification limits scheduling opportunities
 - If match does not exist, parallel is not scheduled
 - Long parallel opportunities are difficult to schedule
 - Buffer dump conflicts are problematic for long parallels
 - Prioritization and completion of parallel visits are not handled optimally
 - Know completion rate only after observations execute (end of cycle)
- New implementation should improve parallel science return

Pure Parallels in Cycle 17

- Pure parallels will be treated more like prime observations than in the past
- Ranked/approved by TAC in Phase I process (*as before*)
- Completion rate should be higher than in previous pure parallel implementation
- Default proprietary period of 12 months (*new*)
- Parallels assigned to primes will be carried over to next cycle if specified prime does not execute in Cycle 17 (*new*)
- PI assists in selection of best parallel pointing opportunities (*new*)
- Matching done early (Phase II) rather than late in process (*new*)
- Early assessment of feasibility and ability to schedule (*new*)

Pure Parallel Process



Pure Parallels - Assumptions

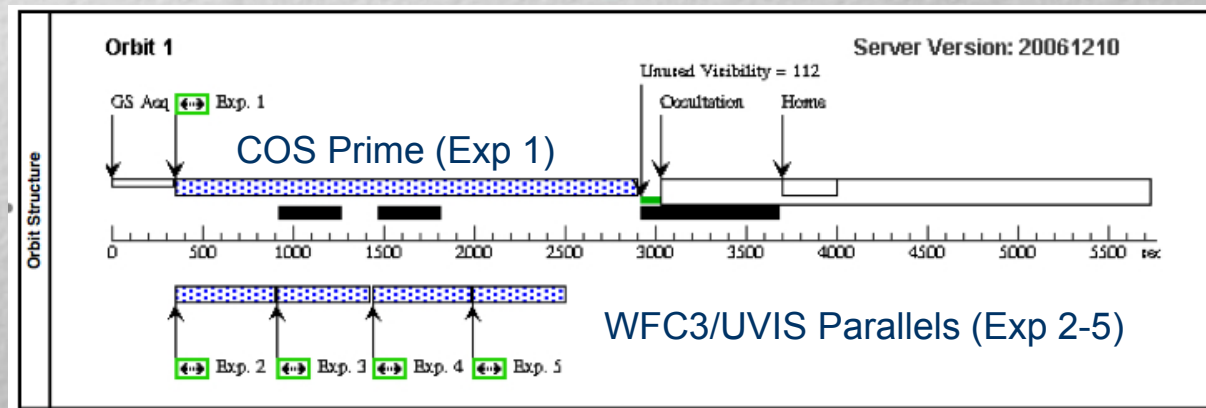
- Pure parallels will be attached only to COS primes with minimal readout conflict (i.e., single COS readout occurs at end of orbit or in occultation)
 - Hundreds of opportunities expected based on COS DRM
 - Examples on slides to follow
- Pure parallels may not impose dithers on COS primes
 - We will consider relaxing this option in Cycle 18
- Pure parallels may not specify absolute orient constraints
- Pure parallels may impose relative orient constraints
 - Orient constraint applied by STScI to allow field matching for parallels
 - Orient will be imposed only when it does not adversely impact COS prime science or scheduling
- Strategy adopted appears feasible with available resources
- Strategy should allow more flexibility in the future if needed

Allowed Pure Parallel Instrument Combinations

- Pure parallels may specify any of the following imagers
 - ACS/WFC
 - ACS/HRC
 - WFC3/UVIS
 - WFC3/IR
- Use of more than one imager in parallel will be allowed
 - Will not match multiple imagers against same prime unless imagers are in same parallel proposal
- Pure parallels may not specify COS, FGS, NICMOS, STIS, or ACS/SBC as the parallel instrument
- Pure parallels must be attached to COS primes (at least for Cycle 17)

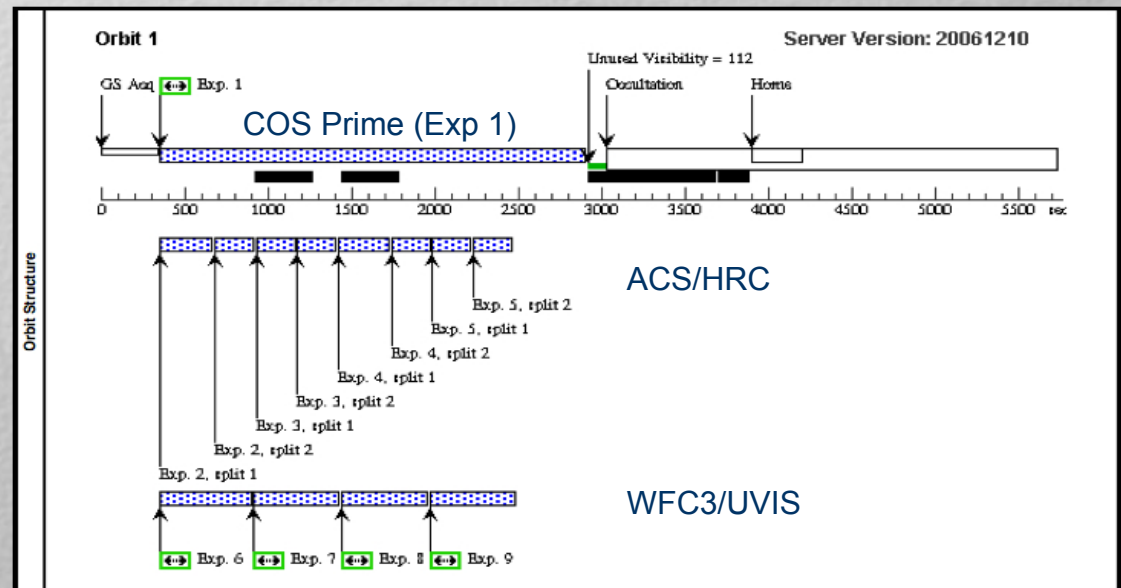
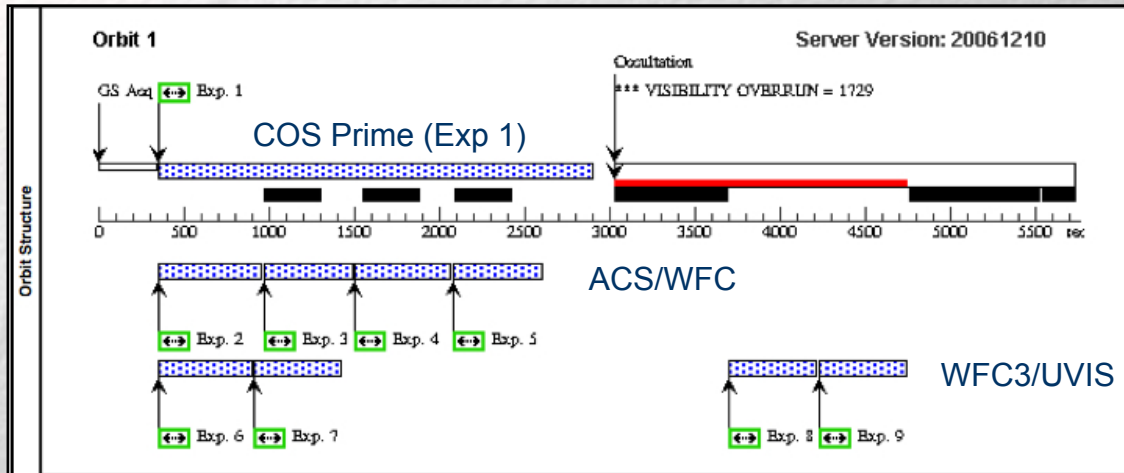
Parallel Opportunities

- Prior to ACS failure, we expected that ACS+WFC3 would be used in parallel frequently.
 - ACS repair would re-enable synergy with WFC3
- COS will probably account for ~25% of prime observing time (~700-800 orbits per cycle)
 - For most COS observations, parallels could be scheduled without readout and buffer dump conflicts



- If ACS is restored, using multiple instruments in parallel at the same time (e.g., WFC3+ACS) results in more buffer conflicts

A Few More Parallel Examples



Examples of Possible Parallel Programs

- Searches for high- z supernovae with WFC3 grism
- Searches for $z > 7$ galaxies with WFC3 IR channel
- WFC3 deep UV fields
- Cosmic variance (ACS or WFC3)
- Cluster mosaics, weak lensing on small scales
- Magellanic cloud narrow band imaging survey
- Nearby galaxy stellar population studies
- and so on....