

ACS overheads from serial buffer dumps

While writing your Phase II proposal, you may have discovered RPS2 scheduling serial buffer dumps resulting in inefficient use of an orbit. These buffer dumps are a result of on-board data management and can add almost 6 minutes of overhead. The solution is to increase the exposure time on the next consecutive exposure in order for the dump to occur in parallel. This will also shorten your RPS2 runtime.

Why are serial buffer dumps scheduling? A serial buffer dump only occurs when it is not possible for the dump to be scheduled in parallel during the next consecutive exposure time. It takes ~348 seconds to dump an uncompressed WFC image and this dump time cannot overlap the readout time. The next consecutive exposure time has to be slightly higher, ~360 seconds, in order to accommodate the dump so it will be parallel and not serial. These numbers will change slightly for any other image types, WFC compression, subarrays, etc. as seen in RPS2.

Please keep in mind that for both WFC and HRC the default CR-SPLIT=2, and in this discussion, each CR-SPLIT part in your proposal is considered to be a single exposure. Consequently, if the exposure in your proposal looks like this:

```
Exposure_Number: 10
Target_Name: generic galaxy
Config: ACS/WFC
Opmode: ACCUM
Aperture: WFC
Sp_Element: F555W
Wavelength:
Optional_Parameters: CR-SPLIT=2
Number_of_Iterations: 1
Time_Per_Exposure: 600s
Special_Requirements:
Comments:
```

Then what is really being asked for is 2-300 second exposures and the buffer dumps will be serial. On the other hand, if your exposure looks like this:

```
Exposure_Number: 10
Target_Name: generic galaxy
Config: ACS/WFC
Opmode: ACCUM
Aperture: WFC
Sp_Element: F555W
Wavelength:
Optional_Parameters: CR-SPLIT=NO
Number_of_Iterations: 2
Time_Per_Exposure: 600s
Special_Requirements:
```

Comments:

Then parallel buffer dumps will be scheduled.

If your program is such that it requires uncompressed WFC exposures shorter than 348 seconds, then placing that exposure at the beginning of an orbit, when no other exposure has to be read out, is advantageous.

It should also be pointed out that a series of short HRC or SBC exposures can also result in serial buffer dumps. It takes approximately 16 HRC or SBC images to fill the buffer. If the following exposure is not greater than 362 seconds, then a serial dump will occur.

Why is RPS2 taking so long? Another question that has come up during Phase II, is RPS2's unusually long runtime. These long runtimes have only been associated with proposals that end up having serial buffer dumps scheduled. It has been found that the algorithm in the RPS2 software is not scheduling serial buffer dumps in the most efficient manner, hence the long runtimes. To reduce the processing time of your proposal, you will need to increase your exposure times so that buffer dumps are parallel and not serial. The algorithm is being reworked, but will not be available before the Phase II deadline.

For additional information you may want to reread the ACS Instrument Handbook, chapter 9 Overheads and Orbit-Time Determination.