Original Orbit Change Request for PropID 9727 (PI Perlmutter) :

Description: For a Program Change Request, detail the changes to be made. For a Resolution of Data Duplication, indicate which programs appear to cause a conflict and why. For a HOPR, describe the problem that occurred.

We request changing some of the orbits of this program to use ACS instead of NICMOS. This cycle 12 program, which comprises followup observations of Type Ia Supernovae at high redshift ($z \gtrsim 1.2$), was originally proposed as all-NICMOS followup of SNe to be found in a separate Treasury proposal (Faber et al.) that eventually was not selected. The TAC recommended that we instead follow SNe found in the approved COSMOS 2-Degree ACS survey. This survey, which had different filters and associated ground followup possibilities from Faber et al., was not well matched to SN searching and orbits were set aside to instead allow a stand-alone search to be done with the ACS/WFC, done in collaboration with A. Riess. Followup of SNe found in this ACS search, which does not have associated ground-based observations, is best performed also using the ACS/WFC F850LP, allowing in some cases search and followup observations to be combined. From our simulations, we find the optimal followup of SNe to result from this search employs the ACS/WFC F850LP for a principal photometric lightcurve, NICMOS F110W and F160W for color measurements and additional lightcurve points, and the ACS/WFC G800L grism for spectroscopy of SN candidates with no host galaxy.

Action Requested (include justification and full description of necessary program changes and, if necessary, orbits needed.)

This 60 orbit program will allow followup of approximately 3 very high redshift SNe. We request to distribute the orbits for each SN among the ACS/WFC F850LP, NICMOS/NIC2 F110W, and NICMOS/NIC2 F160W, with the exact distribution optimized slightly differently for candidates at the low ($z \sim 1.2$) and high ($z \sim 1.5$) ends of the redshift range. In cases where a spectrum of the SN candidate is needed, orbits will implement the ACS/WFC G800L grism.

Additional Information Requested by STScI :

These changes are outlined further in terms of orbits and visits in Table 1. The requested ACS followup observations will occur over a series of 4 epochs. Possible grism data will be taken at the time of the first ACS imaging epoch (i.e., near maximum light). Assuming 5 orbits per visit can be executed, our strategy translates into 4 visits of ACS imaging with an additional $1-2$ visits of ACS grism time, for a total of up to 6 ACS visits *per* candidate.

The exact number of visits and orbits spent at each epoch will depend on the estimated redshift of the candidate. In Table 1 this is indicated by the range specified. Higher redshift objects require a few more ACS/F850LP orbits. We do not expect to need grism observations for each activation of a followup sequence (this is indicated by a dagger, †). However, if a candidate warrants spectroscopic confirmation, we intend to use 7 ACS grism orbits for a SN at $z \sim 1.2$ or 11 for a SN at $z \sim 1.5$.

Summary : The expected number ACS visits will be in the range $12-18$.

Table 1. SINGLE CANDIDATE OBSERVATIONS

	Number of Orbits	Number of Orbits	Number of Visits
ACS Visits			
Epoch 1	1-2 ACS/F850LP	7-11 ACS/G800L †	2-3
Epoch 2	1-2 ACS/F850LP		1
Epoch 3	1-2 ACS/F850LP		1
Epoch 4	1-2 ACS/F850LP		1
NIC Visits			
Epoch 1a	1 NIC2/F110W	2 NIC2/F160W	1
Epoch 2a	1 NIC2/F110W	2 NIC2/F160W †	1
Epoch 3a	1 NIC2/F110W	2 NIC2/F160W †	1
Epoch 4a	1 NIC2/F110W †		1
Final Refs			
	1 NIC2/F110W	2 NIC2/F160W	1 (1 year later)

†These options may not be necessary.