ZTF Partnership Year 2 Survey Strategy: SSC Recommendations

26 March 2019

Following review of the 3 responses submitted by the ZTF collaboration to our RFI (http://www.oir.caltech.edu/twiki_ptf/bin/view/ZTF/SurveyStrategyRFI), the SSC makes the following recommendations:

We start with the currently implemented Year 1 observing strategy from the Experiments and Framework Committee (see https://docs.google.com/document/d/1kCCHyabpkuAoFFoAGWVVYu5pXgOQTM_-XHmOqrEGUpY/edit for a description, and the RFI and Bellm et al. 2019 for the on-sky implementation) as a baseline. We then recommend the following modifications for Year 2:

1) EM-GW Follow-Up: We recommend the partnership conduct target-of-opportunity (ToO) observations of neutron star binary (either NS-NS or NS-BH) mergers discovered by their gravitational wave emission. We provisionally endorse the proposed follow-up strategy for these events - given the significant uncertainty in the rates of these sources, we (the SSC) intend to reevaluate the follow-up strategy (i.e., number of triggers, time spent per trigger), in consultation with the Multi-Messenger Astrophysics Science Working Group and other Science Working Group co-chairs, **after the first two ToO triggers**. Finally, we note the Project Scientist needs to be promptly informed of all partnership ToO triggers.

2) Variable Compact Objects in the Galactic Plane: We recommend that the partnership conduct intensive observations of the inner Galactic Plane in the R-band during the months of June, July, August and September. Furthermore, we recommend that the leaders of the Galactic Science Working Group and Physics of Supernovae and Supernova Cosmology Working Groups work with the SSC Chair, Project Scientist, and Survey Scientist to define a program that will maintain some of the most critical extragalactic science objectives during this period (i.e., young supernovae and low cadence i-band coverage). One possibility, for instance, could be to spread out the Galactic Plane observations over a slightly larger time period. The strategy for these observations will depend on any changes made to the MSIP survey cadence, and so should be developed over the coming months with this in mind.

3) Twilight Survey for Solar System Objects: We provisionally recommend a twilight survey (between 12-18 deg twilight, both evening and morning) to conduct 4x R-band images of ~ 800 square degrees every 3 nights, beginning immediately. The evening and morning observations should be staggered (i.e., evening on Night 1, morning on Night 2, no twilight observations on Night 3, then repeat). The twilight survey should be suspended

when the intensive observations of the Inner Galactic Plane begin in ~ June. At this time, the SSC will request input from the Science Working Groups regarding negative impacts on extragalactic programs, to determine if the twilight survey should be continued after the termination of the Galactic Plane program. To accommodate this program within the partnership time, we recommend a reduction in the intra-night cadence of the high-cadence extragalactic fields but no reduction in areal coverage (on those nights when the twilight survey is executed).