# Survey Strategy

## White Papers

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<th>Received 46 white papers</th>
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How should LSST survey the sky?

- Every night for 10 years (~2.5M visits)
- Publish expected observations 1-2 hrs ahead
- Bright time, dark time, including non-photometric or bad seeing conditions
- Maximize efficiency - slew time AND best image conditions (seeing, sky brightness, filter) - and don’t do anything ‘obviously wrong’
- Optimize science - sky coverage, uniformity, timing/cadence .. science metrics — COMMUNITY HELP
**Survey Strategy Timeline**

- **July 2018:** Call issued July 2018
- **Nov 2018:** White papers received
- **Jan 2019:** LSST Science Advisory Council (SAC) meeting to review white papers
- **April 2019:** LSST SAC recommendations for OpSim investigations
- **Early 2020:** Project delivers simulations to the “Survey Cadence Optimization Committee (SCOC)"
- **Early 2021:** SCOC delivers recommendations to LSST Operations Director
- **Mid 2021:** Project delivers baseline simulation of initial survey strategy
- **Late 2022:** LSST Operations start

+Cosep ongoing
46 white papers received

- ~7 requests for varying WFD footprint - further north (low-extinction footprint) or into galactic plane (galactic variability)
- ~10 requests for (different) cadences of visits in WFD
- (lack of) visit gap requirements, rolling cadence
- specify filters for pairs of visits; filters for triplets of visits
- 3 requests for WFD/all sky footprint minisurveys
- 1-2 g band high airmass visits for DCR (AGN); short (5s) visits (photometric tie-in with Gaia); trailed (1s-15s) exposures (subsecond variability)
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- 3 ToO programs
- 3 co-observing with EUCLID or WFIRST
- 4 white papers on current/standard DD fields
  - cadence of observations, u band depth, location of 5th field
- ~11 minisurvey suggestions
  - follow specific targets for limited (intense) periods of time
- 1 paper on NES (solar system), 2 on general ‘northern’ coverage (DESI, Euclid)
  - short exposure, high X, twilight survey along ecliptic +/- 20deg (NEO)
- ~6 papers on galactic plane coverage, 1 on GP/SCP (stellar pops, variability, LMC/SMC)
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- Snap/visit exposure times:
  - Many prefer ~30s (1 snap/visit) [7% more efficient]
  - But some still prefer 2x15s snaps - some in limited area only (white dwarf transits, rapid variability/saturation)
  - + 1 request for 2s/28s snaps
  - + minisurvey for 5s visits
  - + minisurvey for 1s-15s trailed images
Identifying ‘Families’ of simulations

Rough amount of time requested = 115-250%
Area (footprint) & number of visits: “LynneSim”** tool
• See https://github.com/lsst-pst/survey_strategy_wp repo

** Blame Phil Marshall.

Previous baseline: 95% of visits in 2x1.5s (snaps) simulation
Potential new footprints: 95% of visits in 2x15s (snaps) simulation
OpSim & MAF

- OpSim runs will be done with new “Feature Based Scheduler”
- More flexible than previous ‘proposal based scheduler’
- Runs faster - 10 year simulation in ~7 hrs
- MAF will keep previous metrics, plus adopt metrics from white papers & COSEP
Families of simulations

- SRD requirements must be met (including 825 visits/18k sq deg)
- Must do snaps/no-snaps simulations
- Variations on footprint - add/remove components, vary WFD
- Variations on cadence within the footprint
  - Rolling cadence, intra-night cadence (pairs/no pairs/filters)
- Variations on DD - cadence and 5th field
- Attempting to keep transparency in process - intermediate stages of opsim experiments will be released but should be understood as PRELIMINARY
- Intermediate feedback via additions to COSEP (science + metrics)
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