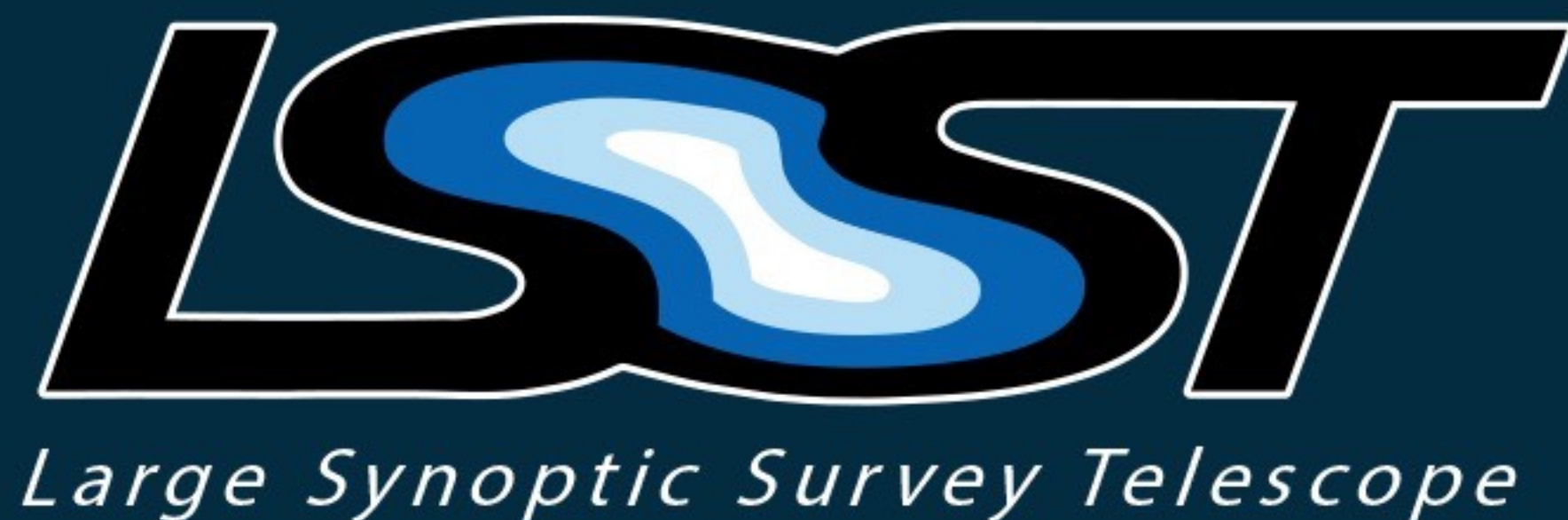


# Incremental Template Generation in LOY1: Options and Open Questions

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DMLT  
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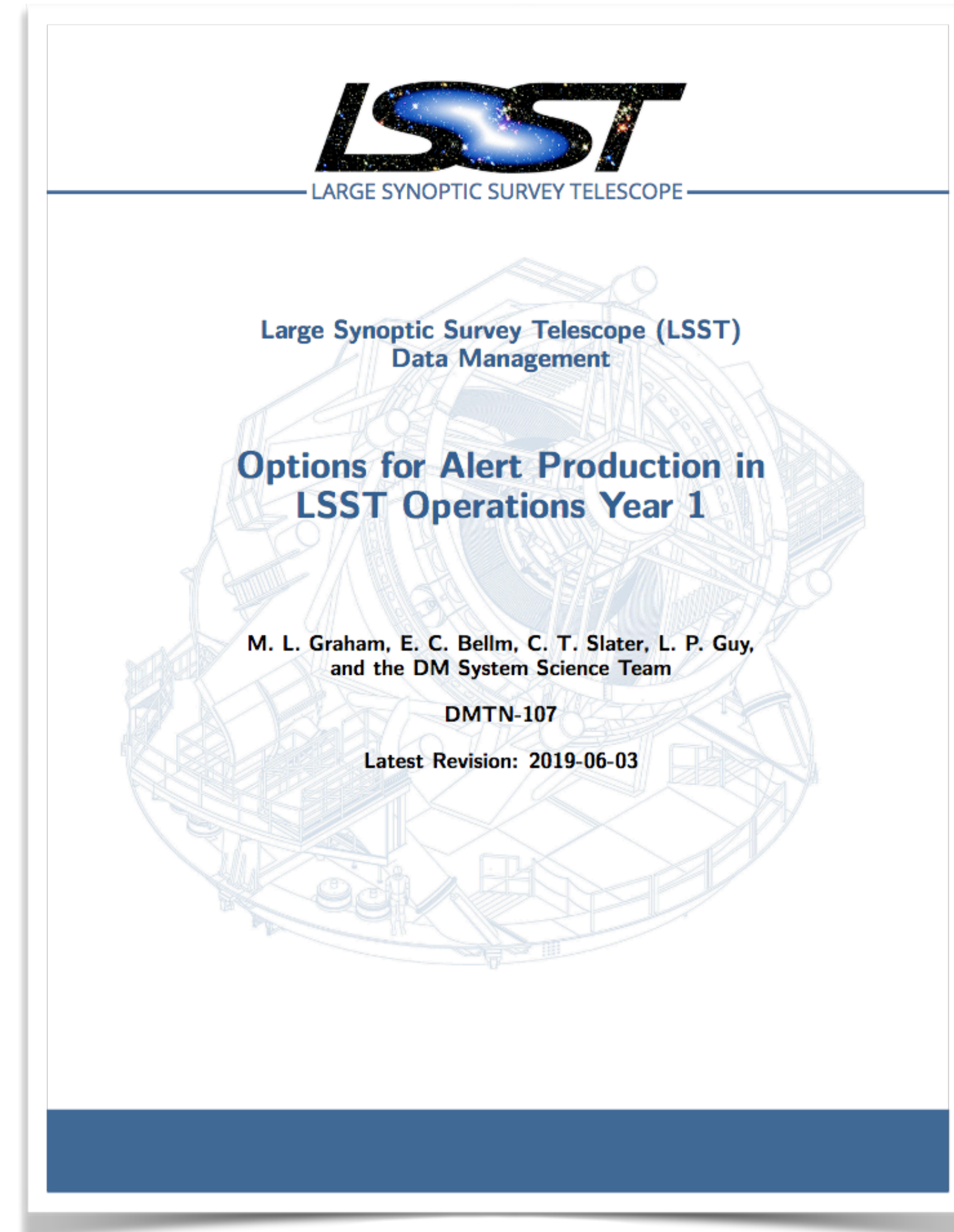
# Alert Production in LOY1 requires special treatment.

No all-sky DRP-produced templates prior to DR1.  
DM-SST outlined several options in DMTN-107.

- do nothing
- build templates from commissioning data (SST preferred)
- build templates incrementally in LOY1 (SST preferred)
- conduct image-image differencing
- conduct catalog differencing

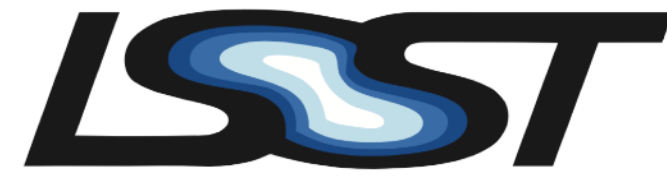
Discussed repeatedly in late 2019 by DM-SST & PST.

- October SST notes
- November L. Guy PST+SC presentation
- 2019-12-04 PST call



<https://dmtn-107.lsst.io/>

# Resolving these issues requires further study.



Ops has begun public messaging that “full volume, full-fidelity” alert production will occur after DR1

- cf. Blum presentation at AAS Open House

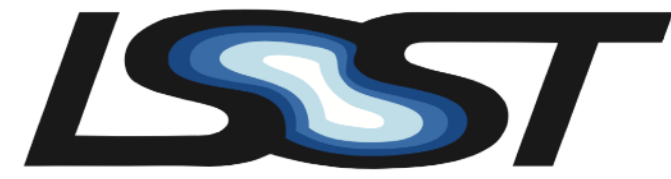
Clear support within the project for using DP2 templates built from commissioning data where they exist

- Whether this goal influences commissioning data-taking is TBD
- But compression of commissioning schedule means sky area covered may be small
- Agency emphasis on early science therefore makes incremental template generation more vital

Incremental template generation in LOY1 is new scope; a cost assessment is needed

- DM Construction effort to develop or modify pipelines and workflow
- Operations effort for executing pipelines and performing QA
- Operations computing impacts  
(and any interactions with deferring hardware purchases to ops)

# Let's discuss estimates for the required effort.



Somewhat sensitive to how often “incremental” is, and the degree of automation

- “Monthly” template generation has been mooted (by me)
- ZTF triggered automated template generation workflows nightly during early ops

## Construction: Pipeline & workflow development

- Pipelines effort: we can already coadd ad-hoc combinations of images
- Modest effort (1-3 months?) to write scripts to identify when new imaging allows a missing template to be built, select the appropriate exposures, run the coaddition, and stage them

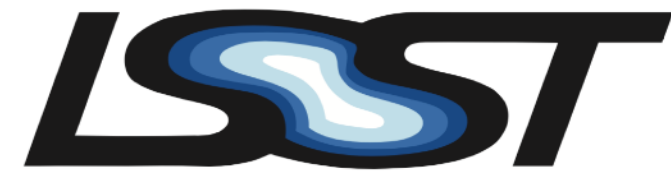
## Ops: Execution and QA

- 0.25 + 0.25 FTE in LOY1 for babysitting the template generation execution and QAing the outputs? Likely this is consistent with effort that's in the ops “AP” bucket already

## Ops: Computing

- If we are running SFP on all images in ~realtime, the incremental coaddition is trivial

# (What about image-image differencing?)



## Pros:

- Possible to do image subtraction sooner (by days-weeks), since only one image is needed
- Will make some PST members happy

## Cons:

- Equal or larger construction effort upscope to enable identification and bookkeeping of appropriate calexps to use as templates
- No ability to reject artifacts
- Pollute the DIASource/DIAObject tables with negative subtractions of asteroids that aren't rejected from the template
- Are less sensitive due to higher noise in the “template” (and violates OSS-REQ-0158)
- Require us to use the same single image as a template throughout LOY1 or suffer repeated shifts in DIAObject lightcurve baselines

**ECB's view: clearly the pipelines must support users who want to do image-image differencing, but we should not run it in production**