LCR-1554 proposal

(Gregory Dubois-Felsmann, 31 January 2019)

(1) No change to SRD.

(2) Retire LSR-REQ-0097 and restate it as two new requirements, as follows:

LSR-REQ-xxE1

Specification: Using the full survey data, in the *r* and *i* bands, the distributions of the residual ellipticity correlation functions for stars E_1, E_2, and E_X (defined in equations 12, 13, and 14 in the SRD, LPM-17), averaged over an arbitrary FOV for a correlation scale \theta (as defined in the associated SRD text) SHALL have medians less than **TE1** for \theta <= 1 arcmin, and less than **TE2** for \theta >= 5 arcmin. For scales between 1 and 5 arcmin, the median SHOULD vary smoothly but SHALL not exceed **TE1**.

Discussion: It is expected that at the start of operations this full-survey requirement will be validated against some combination of commissioning mini-survey data, simulations, and analytical extrapolations to the full survey.

The intent of the "should" statement on smooth variation of the medians in the full survey data is that the distribution between 1 and 5 arcmin is to be evaluated as part of the validation process, and inspected at that time for any surprising features, based on scientific judgement at the time.

While the requirement applies only in the *r* and *i* bands, and relies on an assumption that if it passes the behavior in the other bands should be reasonable, the validation measurements should be performed and recorded for all bands in order to avoid surprises.

Description	Value	Unit	Name
Maximum full-survey median for residual ellipticity correlations at scales less than or equal to 1 arcmin	2.0e-5	unitless (angular correlation)	TE1
Maximum full-survey median for residual ellipticity correlations at scales greater than or equal to 5 arcmin	1.0e-7	unitless (angular correlation)	TE2

Specification: No more than a fraction **TEF** of individual calibrated visit images in the *r* and *i* bands in the main survey SHALL have the medians of any of the residual ellipticity correlation functions for stars E_1, E_2, and E_X (defined in equations 12, 13, and 14 in the SRD, LPM-17) greater than **TE3** for scales \theta < 5 arcmin, or greater than **TE4** for scales \theta >= 5 arcmin.

Discussion: The **TE3** requirement on individual images is extended from the SRD's "< 1 arcmin" definition to cover the gap between 1 and 5 arcmin. Note that this is a less stringent requirement than the **TE4** limit which it meets at 5 arcmin. As this requirement envisions a yes/no test on individual images, it was deemed impractical to require the addition of a "smooth variation" requirement in the gap – in contrast to the approach taken in the full-survey requirement LSR-REQ-xxE1.

The "in the main survey" qualification was included in order to ensure that this requirement was not applied to arbitrary special-programs or other non-standard observations. It envisions that some "acceptable for inclusion in the main survey" data quality decision is likely to be included somewhere in the operational model. The fraction **TEF** is to be evaluated *following* any such filter, on the same set of images that will be used, e.g., to evaluate whether the **Nv1Sum** requirement in LSR-REQ-0098 has been met.

It is expected that at the start of operations the present requirement will be evaluated against the images available at that time, from commissioning, after the application of a proposed classification of images as acceptable for the main survey.

While the requirement applies only in the *r* and *i* bands, and relies on an assumption that if it passes the behavior in the other bands should be reasonable, the validation measurements should be performed and recorded for all bands in order to avoid surprises.

Description	Value	Unit	Name
Per-image limit on the median residual ellipticity correlations at scales less than 5 arcmin	4.0e-5	unitless (angular correlation)	TE3
Per-image limit on the median residual ellipticity correlations at scales greater than or equal to 5 arcmin	2.0e-7	unitless (angular correlation)	TE4
Maximum fraction of visit images that may exceed the TE3 or TE4 limits	15	percentage	TEF

(3) Retire OSS-REQ-0390 and OSS-REQ-0234 and replace them with exact copies of the two new LSR requirements, located in place of OSS-REQ-0234
(4) Retire OSS-REQ-0389