



MEMORANDUM

DATE: September 11, 2015

TO: The LIGO Operations Management Team
FROM: L. Barsotti, M. Landry, B. O'Reilly for the JRPC
SUBJECT: O1 readiness

The First Observing Run O1 was scheduled to start on Monday, September 14, 2015 at 8 am PT/ 10 am CT.

A discussion to evaluate readiness for O1 has been held during the Joint Run Planning Committee call on Thursday, September 10, 2015
(Minutes: <https://wiki.ligo.org/LSC/JRPCComm/Minutes2015Sept10>).

Concerns have been raised during the call about critical deliverables not being ready, in particular the GDS calibration, and an end-to-end analysis of hardware injections.

The recommendation from JRPC is therefore to delay the beginning of the run to allow for these tasks to be completed.

Based on inputs from all the groups involved (see attachment) and estimates of the time needed to accomplish critical tasks (see following sections for details), we anticipate as a possible starting date Friday, September 18, 2015 (8 am PT/ 10 am CT).

An all-hands discussion to establish readiness will be held on the JRPC call next Thursday, September 17, 2015, 10.30am ET.

Critical deliverables to be completed before the beginning of O1

1. Calibration: update of the GDS calibrated spectrum, both sites.

The absolute calibration of the two LIGO detectors is well understood, and the accuracy has been estimated as $\pm 10\%$ in magnitude, and 5 degrees in phase. This level of accuracy is adequate for all the data analysis searches. However, the GDS calibration, used by all of the data analysis pipelines, has not been updated yet. This will be done by the end of Monday, September 14, at both sites.

2. Hardware injections: end to end test, both sites

The recovery of hardware injections through the whole analysis chain and a statement of fidelity in the recovery is considered a crucial end-to-end cross check of the analysis process. Once the GDS calibration has been completed, the needed Burst, CBC and CW hardware injections can be accomplished in less than two days. Long CW injections at nominal strength are preferred, but only a few hours of CW injections at increased strength are acceptable. Detector characterization studies of veto safety can be performed in parallel with a negligible time impact.

3. Electromagnetic trigger alerts

The pipeline of generating electromagnetic trigger alerts for consumption by astronomers external to the calibration includes: i) the initial event trigger generation and automated notification to partners, ii) alarms at site control rooms and the operator site OK/Not OK response, iii) the automated IDQveto evaluation of the event and the possible automated canceling of the event, and iv) the Rapid Response Team (RRT) follow up of the event, both on site and off. Many of these components are in place. The tailoring and testing of the IDQveto must be performed. The site alarm processes have latencies that are not yet understood and thus need to be tested. The RRT is identified but not yet exercised: hardware injections on Sep 15-16 provide an opportunity for the RRT to practice follow-up. The EM trigger team is reasonably confident these elements can be ready for Friday Sep 18. The team notes that their codes will be not completely reviewed at this date however.

4. Computing stability

Concerns have been raised regarding the stability of offline generation within LDAS, GDS $h(t)$ generation and DQ segment generation. A 3 day integrated stability test without failures has not yet been passed. The proposed O1 starting date will allow for stability tests to be completed.