



LIGO LABORATORY

MEMORANDUM

DATE: 26 May 2018

TO: All LIGO Laboratory Staff (ligo-all@ligo.caltech.edu)

FROM: Hannah Hansen (Business Manager)
Dennis Coyne (Systems Engineer)

SUBJECT: Procurement Workflow for Detector Upgrades

Refer to: LIGO-M1500262-v3

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1 Scope

This memo defines the workflow for LIGO observatory Detector Improvements (DI, aka upgrades or enhancements) in the Production/Procurement phase, i.e. the phase after design & development has been completed.

2 Prerequisites

A Design Review process¹ is to be conducted for every proposed DI, prior to going into the Production/Procurement. The nature and manner of the Design Review (DR) is defined by Systems Engineering.

3 Basic Process

If the Final Design Review (FDR) outcome is approved from Systems Engineering, then the following steps are to be taken (see also the attached flowchart):

- 1) Systems Engineering:
 - a. Approves an Engineering Change Notice (ECR) which documents the approved change to the system baseline design (per [M1200274](#))

¹ The principal reference for our design review process is [M1500263](#), "Guidelines for Advanced LIGO Detector Improvement Development Review". This document defines a general multi-phase, multi-review process. Systems Engineering may abbreviate the review process if warranted by the maturity and/or complexity of the development effort.

- b. Updates the planning/tracking document covering all approved and planned future detector upgrades ([M1500001](#)).
 - c. Appoints a Project Manager for the Production/Procurement Phase.
 - 2) The Project Manager, or Systems Engineering, submits the following to the Business Manager:
 - a. Change Request (CR, using form [F0900037](#) in accordance with process [M1400104](#)): The CR must be consistent with the budget/costing provided to the DR, and should cite the ECR. A change request is required regardless if additional funds are being requested for the “source account” and regardless of the amount of funds involved; The CR is used by the Business Group as the mechanism for documenting the request for a new sub-account within the “Detector Enhancements” budget line item, as part of the Hanford and Livingston WBS Accounts.
 - b. Fabrication Account Request (form [F080013](#); see also guidance [M1400002](#)). Note that all detector upgrades are considered “deliverables” and require a fabrication account for each observatory, unless the upgrade project involves only the purchase of one or more “equipment items”².
 - 3) The Business Manager reviews the CR and iterates with the Project Manager if/as needed.
 - a. If no additional funds are requested, or if the cumulative, additional funds requested for the “source account” are less than the CCB threshold³, then the Business Manager will request signatures via the DCC to document the approval of a new Project Task Account (PTA). If an equipment fabrication account request is being processed then the Business Manager will work with Caltech Property Services to obtain approval. Once approval is received the Business Manager will communicate the PTA to the PM and work can begin. If a stand-alone piece of equipment is being purchased the Business Manager will request a new PTA from Caltech Project Accounting and communicate to Project Manager. Once the PM has the PTA the purchase can be initiated.
 - b. If the cumulative additional funds requested for the “source account” exceeds the CCB threshold, then the Business Group Manager schedules a CCB review. If possible, the Business Group Manager should suggest potential sources of funds to cover the request.
 - 4) If necessary the CCB reviews the CR and allocates funds if/as required, or rejects the CR. If/when approved by the CCB, the Business Group will establish the appropriate accounts and inform the Project Manager (who is also the assigned account manager), as outlined above in 5a.
 - 5) The Business Office and the Project Manager are jointly responsible for tracking the expenditures against the planned expenses. The Project Manager must bring any financial concerns (expected over or under runs) to the attention of the Business Manager.

² [Equipment Thresholds defined by Caltech Financial Services](#): acquisition cost of each item is > \$5K, has a useful life of > 2 years and is not integrated into a building.

³ The threshold defined in M1400104 is \$75K for CCB approval.

4 Early Project Start and Long Lead Procurements

Often it is necessary, due to pressing schedule, to begin working on aspects of the project before all initial costing has been completed, e.g. before vendor quotes have been received. One common occurrence is the need to pursue a long lead procurement item(s) before a final design review has been completed. This can be accomplished as long as the following conditions are met:

- 1) permission to proceed has been granted (in writing) by Systems Engineering, which defines the approved early scope of work, and
- 2) A cost estimate (even if rough or inaccurate) has been provided that covers the entire scope of the proposed upgrade project.
- 3) A draft Equipment Fabrication request, if applicable, has been submitted to the Business Manager for review and processing.

5 Revised Costing

If the initially submitted CR is based on an early, inaccurate costing (e.g. in advance of receiving vendor quotes), then when a better cost estimate is in hand, the CR should be revised. The revised CR should be treated like any other CRs, per the process defined in [M1400104](#).

6 Procurement Practices in the Production Phase for Engineering

Procurement guidance for instrument developers/engineers in the procurement/production phase can be found here:

https://dcc.ligo.org/mediawiki-1.22.2/index.php/Engineering_for_LIGO/Procurements

7 Upgrade Project Close-out

Once the project has been completed, the Business Manager will work with the Project Manager to account for any under-run or over-run and document the transfer of funds in a close-out CR.

M1500262-v3, Procurement Workflow for Detector Upgrades

