LIGO PROJECT

PROJECT COST CONTROL

- COST ESTIMATING PLAN
- UPDATING COST ESTIMATES

C. AGUIRRE
U.S. COST

LIGO-G940031-00-M

LIGO PROJECT

COST ESTIMATING PLAN

- DEFINES FOR THE COST ESTIMATING PROCESS

  - GUIDELINES

  - METHODOLOGIES

  - ASSURANCE THAT ESTIMATES ARE COMPLETE & CONSISTENT

LIGO PROJECT

COST ESTIMATING PLAN

- OBJECTIVES

  - DEVELOP COMPREHENSIVE COST FOR ALL WBS ELEMENTS

  - DETAILED BACKUP INFORMATION THAT WILL JUSTIFY ALL ESTIMATES AND PROVIDE CONFIDENCE TO REVIEWING ORGANIZATIONS THAT THE COSTS ARE REASONABLE

  - VENDOR QUOTATIONS, ENGINEERING CALCULATIONS, DRAWINGS, SIMILARITIES TO OTHER SYSTEMS AND OTHER PERTINENT DATA WILL BE COLLECTED AND ORGANIZED

  - CRITICAL ASSUMPTIONS MADE DURING THE ESTIMATING PROCESS WILL BE DOCUMENTED

LIGO PROJECT

COST ESTIMATING PLAN

- OBJECTIVES

  - CONTINGENCY WILL BE ASSESSED AT WBS LEVEL 3 TO ACCOUNT FOR UNCERTAINTIES & COST RISK

  - COST TRACKING BASELINE
    THE COSTS OF THE LIGO PROJECT WILL BE MONITORED AND MUST BE CONTROLLED OVER THE LIFE OF THE PROJECT

Table 7. Risk Factor

Risk factor	Technical	Cost	Schedule
1	Existing design and off-the-shelf hardware	Off the shelf or catalog item	not used
2	Minor modifications to an existing design	Vendor quote from established drawings	No schedule impact on any other item
3	Extensive modifications to an existing design	Vendor quote with some design sketches	not used
4	New design within established product line	In-house estimate for item within current product line	Delays completion of non-critical path subsystem item
6	New design different from established product line. Existing technology	In-house estimate for item with minimal company experience but related to existing capabilities	not used
8	New design. Requires some R&D development but does not advance the state-of-the-art	In-house estimate for item with minimal company experience and minimal in-house capability	Delays completion of critical path subsystem item
10	New design. Development of new technology which advances the state-of-the-art	Top down estimate from analogous programs	not used
15	New design way beyond the current state-of-the-art	Engineering judgment	not used

Table 8. Risk Percentage

	Condition	Risk percentage
Technical	Design or mfg concerns only	2%
	Design and mfg concerns	4%
Cost	Material cost or labor rate concern	1%
	Material and labor rate concern	2%
Schedule		1%

LIGO PROJECT

COST ESTIMATING PLAN

- COSTING METHODOLOGY

  - DEVELOP LABOR & MATERIAL COST FOR LOWEST LEVEL WBS ELEMENTS

  - IMPLEMENT A RELATIONAL DATABASE TO MANAGE ALL GENERATED COST DATA

  - PROVIDE CONSISTENT APPROACH FOR COST DATA COLLECTION FROM VARIOUS PROJECT ESTIMATING CONSTITUENTS

  - CHARACTERIZATION OF COST ITEMS BY ESTIMATE TYPE

    1) **Bottom-up (BU)**
    2) **Specific analogy (SA)**
    3) **Parametric study (PS)**
    4) **Review and update (RU)**
    5) **Trend analysis (TA)**
    6) **Expert opinion (EO)**

LIGO PROJECT

UPDATING COST ESTIMATES

- COLLECT & USE ALL PROJECT INFORMATION
  - TECHNICAL DOCUMENTS & REPORTS
  - DRAWINGS, SKETCHES, ETC.
- CONFIGURE RELATIONAL DATABASE TO:
  - LIGO WBS
  - COST ESTIMATING PLAN NUANCES
  - NSF COST REPORTING REQUIREMENTS
  - PROJECT CONTROL REQUIREMENTS

LIGO PROJECT

UPDATING COST ESTIMATES

- CONVERT EXISTING ESTIMATE INTO RELATIONAL DATABASE (SUCCESS)
- DETERMINE WHICH WBS ELEMENTS REQUIRE A BOTTOM-UP ESTIMATE
- DETERMINE LABOR RATES FOR EACH PROJECT SITE
  -DESIGN
  -CONSTRUCTION
- DETERMINE MATERIAL COSTS FOR EACH PROJECT SITE
- COORDINATE ALL DESIGN AND CONSTRUCTION PHASES ESTIMATES AMONG LIGO ESTIMATING TEAM MEMBERS

LIGO PROJECT

UPDATING COST ESTIMATES

- DEVELOP ESTIMATES FOR ALL WBS ELEMENTS WITH MORE ADVANCED DESIGN
- APPLY RISK ASSESSMENT METHODOLOGY TO ALL WBS 3 LEVELS
- DEVELOP REPORT TEMPLATES & GENERATE NSF REPORTS
- DEVELOP DATABASE QUERY TO UPLOAD INTEGRATED PROJECT SCHEDULE