

SuperCDMS at SNOLAB Project Office <b>BASIS of ESTIMATE FORM (BoE)</b>		<b>Document Number:</b>	
		<b>Date of Estimate: 28-Oct-16</b>	
		<b>Prepared by: Scott Oser</b>	
<b>UID Number:</b>	<b>WBS Section: 1.6.9</b>		
<b>Task Name: DAQ/Trigger Management and Travel</b>			
<b>Cost Type:</b>	<b>Costing Method:</b>	<input checked="" type="checkbox"/> Prior purchase or experience Source: _____	<input type="checkbox"/> Catalog Price Source: _____
<input checked="" type="checkbox"/> M&S <input checked="" type="checkbox"/> Labor	<input type="checkbox"/> Engineering Estimate <input type="checkbox"/> Vendor Quote (attached)	<input type="checkbox"/> Other- Description: _____	
<b>Attach Relevant Documents (including but not limited to):</b> RFP, Responses to RFP, Technical Evaluation of RFP, Vendor Quotes, Technical Specifications, drawing numbers			
<b>Task Duration:</b> (calendar weeks, 85% achievable ): <b>weeks</b> (this applies only for BoE's written at lowest task level)			
<b>Task M&amp;S Cost (FY14\$): \$131.6K, not including overhead</b> See cost table below <b>Task M&amp;S Contingency (%): 15 %</b>		<b>Task Labor</b> (resource type & work hours or % for duration of task, 85% efficiency assumed): <b>1800 hours</b> See labor table below <b>Task Labor Contingency (%): 30 %</b>	

**Change Log**

Date	Description
2015/8/21	Initial version
2015/9/3	Corrected typo in total M&S cost
2016/3/24	Renumbered WBS (was previously 1.6.8, is now 1.6.9). Consolidate all travel for 1.6 in this L3
2016/6/28	Reductions in travel budget
2016/7/26	Move some travel from FY16 to FY17 to better match revised schedule. Total cost unchanged.
2016/8/31	Add a summary table showing travel by institution for each fiscal year
2016/10/28	Explicitly list USD overhead in travel budget tables

**Details of Estimate:** A summary of the costs at level 4 is included in the table below. Tasks are separated by M&S and labor. Labor is estimated in hours.

This BoE contains project management and travel costs for the DAQ/Trigger. This includes the effort of the L2 manager (Scott Oser, UBC) and the deputy L2 manager (Dave Toback, Texas A&M), and travel for each of them to attend one project management meetings a year for FY2017 and FY2018.

Based on the time commitment to date the time is estimated to be 5 hours per week for both people. The L2 manager and L2 advisor are not supported by project funds, and so their efforts are billed at an hourly rate of \$0/hr. Only time after January 7, 2016 is included for FY2016. The hiring of a DAQ programmer at TRIUMF on project funds is listed as a milestone for use in scheduling work by this programmer in other WBS tasks.

Each L3 in WBS 1.6 has estimated the number and nature of trips required in order to complete the work in that WBS. The following table breaks down the list by year and institution, as well as showing the total cost. The bulk of the trips are work at test facilities to test and debug the DAQ and trigger system with detectors. Because overhead at USD is higher, it is listed separately.

Trip description	Cost/trip	FY2016 trips	FY2017 trips	FY2018 trips	FY2019 trips	TOTAL DIRECT COST	USD OVERHEAD (47%)
7 days at test facility (SLAC/UMN/UCB)	\$1810	USD: 3 UMN: 1	TRIUMF: 2 USD: 6 TAMU: 1 UCB: 1	TRIUMF: 2 TAMU: 4		20 x \$1810 = \$36200	\$7656
14 days at test facility (SLAC/UMN/UCB)	\$3070	USD: 1 UMN: 1	TRIUMF: 5 USD: 2 UMN: 1	TRIUMF: 4 TAMU: 6 USD: 1 UMN: 1		22 x \$3070 = \$67540	\$5772
3 day project management meeting (SLAC/FNAL)	\$1090		TRIUMF: 2 TAMU: 1	TRIUMF: 2 TAMU: 1		6 x \$1090 = \$6540	
14 days at SNOLAB	\$2878				TRIUMF: 2 FNAL: 1	3 x \$2878 = \$8634	
21 days at SNOLAB	\$3888				TRIUMF: 2	\$7776	
14 days at TRIUMF	\$2049			FNAL: 1		\$2049	
21 days at TRIUMF	\$2813			UCB: 1		\$2813	
<b>TOTAL</b>		\$13,380	\$45,930	\$55,832	\$16,410	\$131,552	

The following table spells out the cost breakdown for trips of different types. All prices are in US\$. Meals are charged at \$50/day in the local currency. Hotel, flight, and rental car expenses are estimates based on recent experience with travel to these locations.

Trip description	Flight	Hotel	Local transport	Meals	Cost/trip
7 days at test facility (SLAC/UMN/UCB/Queens)	\$450	\$980	\$100	\$280	\$1810
14 days at test facility (SLAC/UMN/UCB/Queens)	\$450	\$1960	\$1000	\$560	\$3070
3 day project management meeting (SLAC/FNAL)	\$450	\$420	\$100	\$120	\$1090
14 days at SNOLAB	\$858	\$1310	\$273	\$437	\$2878
21 days at SNOLAB	\$858	\$1966	\$410	\$655	\$3888
14 days at TRIUMF	\$450	\$1092	\$70	\$437	\$2049
21 days at TRIUMF	\$450	\$1636	\$70	\$655	\$2813

The following table summarizes the travel per fiscal year for each institution.

Institution	FY2016	FY2017	FY2018	FY2019
USD	\$8,500	\$17,000	\$3,070	
USD overhead	\$3995	\$7990	\$1443	
UMN	\$4,880	\$3,070	\$3,070	
TRIUMF		\$21,150	\$18,080	\$13,532
TAMU		\$2,900	\$26,750	
UCB		\$1,810	\$2,813	
FNAL			\$2,049	\$2,878
TOTAL DIRECT	\$13,380	\$45,930	\$55,832	\$16,410
OVERHEAD (USD ONLY)	\$3995	\$7990	\$1443	\$0

W.B.S	Item	Labor type	
		L2 manager	L2 deputy manager
1.6.9.1	FY16 project management (9 months)	180	180
1.6.9.2	FY17 project management (12 months)	240	240
1.6.9.2.1	Milestone: DAQ programmer hired	0	0
1.6.9.3	FY18 project management (12 months)	240	240
1.6.9.4	FY19 project management (12 months)	240	240
	Total	900	900