

LUSI Risk Registry
July 2008

Risk ID	Risk Title	If / Then	POC Owner	Date Last Revised	Risk Values Before Handling				Risk Control Actions			Risk Values After Handling					Risk Retired - Mark "X" for Yes and date	
					Risk Consequence	Risk Probability	Risk Severity Level	Worst Case Cost Impact (AYK\$)	Risk Handling Approach Avoid, Mitigation, Transfer, Accept	Estimated Cost to Implement Handling (AYK\$)	Steps for Handling the Risk (Punch List)	Risk Consequence	Risk Probability	Risk Severity Level	Cost Impact (AYK\$)			
															Best Case	Most Likely		Worst Case
1.1	Management																	
R1.1-001	Design Phase Project Scope Creep	IF the post CD-2 cost estimate for the project during the design phase increases because of scope creep, THEN the contingency available for the later instruments is reduced	T. Fornek		Marginal	Unlikely	Low	50	Mitigate	0	Change control exercised prior to CD-2. Technical Configuration Control Committee in place. Using established LCLS CCB.	Negligible	Unlikely	Low	0	25	50	
R1.1-002	FY2009 CR	CR in FY 2009 extends beyond 6 months (Say 12 months)	T. Fornek		Critical schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo	Very Likely	High	1000	Accept	N/A	Our only alternative is not to schedule work valued at more than FY 2008 allocation for all of FY 2009. This would move CD-4 in to FY 2013. Cost Impact is based on escalation loss due to not receiving \$9M until three years later and 4% escalation. Should still be able to support staff and perform useful work.				0	500	1,000	
R1.1-003	Loss of Key Personnel	IF Lead management, scientific and engineering staff leave the project, THEN there would be significant schedule and cost impacts	T. Fornek		Significant schedule risk Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Likely	High	250	Mitigate	100	Provide for succession of key personnel. Where possible add second scientists to provide for some transition of information. Utilize LCLS Directorate resources where possible. These resources have their own succession strategy.	Marginal schedule risk >\$100K but <\$1M Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely	Low	0	25	50	
R1.1-004	Burden and Overhead	IF SLAC burdens and overheads increase substantially, THEN contingency is reduced	T. Fornek		Marginal	Likely	Medium	600	Mitigate	0	Work with LCLS Directorate and SLAC management to control and manage burdens and overheads	Negligible	Unlikely	Low	0	25	50	
R1.1-005	Severe Accident at SLAC	IF a severe accident occurs at SLAC and stops LUSI work, THEN corresponding schedule delays will occur	T. Fornek		Critical schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo	Very Unlikely	Low	1000	Accept			Critical schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo	Very Unlikely	Low	0	100	1,000	
R1.1-006	Schedule Errors	IF the project schedule is inaccurate due to incomplete planning or logic errors/omissions, THEN the integrated project schedule may be inaccurate.	T. Fornek		Critical schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo	Unlikely	Low	1000	Mitigate	50	Schedule is based on similar activities performed on the LCLS Construction project and at other light sources. Implement schedule reviews prior to CD-2.	Marginal	Unlikely	Low	0	50	100	
R1.1-007	FY2010 CR	IF there is a FY 2010 CR extending beyond 3 months, THEN the schedule will be delayed on a month by month basis	T. Fornek		Critical schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo	Likely	High	600	Accept		Due to the likelihood of an extended CR in FY 2009 and the fact that LUSI is on the upward funding curve, LUSI cannot mitigate the risk. The CR impact will be handled on a real time basis	Critical schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo	Likely	High	0	300	600	
R1.1-008	Lack of engineering resources	IF the engineering staffing is insufficient, THEN schedule delays will occur.	T. Fornek		Critical schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo	Likely	High	500	Mitigate	150	Provide engineering and design staffing levels at approximately 1/2 person-year greater than that planned in the schedule. This could lead to unallocated hours, but the more likely scenario is that the contingency turns in to real work and the cost impact is \$0.	Marginal schedule risk >\$50K but <\$500K L3M delay <3mo, L2M delay <1mo	Unlikely	Low	0	75	150	
R1.1-009	Currency fluctuations	IF the US dollar falls THEN the foreign procurements for the LUSI will be more expensive	T. Fornek	7/9/2008	No tech impact Significant Cost impact (>500K) Negligible schedule impact	Likely	High	600	Accept and Mitigate	150	Agree to price in US dollars early since this is a long lead procurement. Include cost contingency in activities with foreign procurements.	No tech impact Low Cost impact (<50K) Negligible schedule impact	Likely	Low	0	0	0	

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															Best Case	Most Likely		Worst Case
1.2	X-ray Pump Probe Instrument (XPP)																	
R1.2-001	Sample goniometer-schedule delay due to late placement of PO to vendor	IF there is a delay in placing a PO with the/a vendor for the design build contract THEN the eng-design schedule could be delayed	Langton	6/24/2008	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Unlikely 10-40%	Low	25	Mitigate	0	Seek pre-approval of elements prior to BA Insure all stakeholders are aware of status and their requirements are addressed prior to submission for approval Closely track document flow to insure timely sign-off / forwarding Release limited PO only covering eng-design phase	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Unlikely 10-40%	Low	0	10	25	
R1.2-002	Sample goniometer-schedule delay due to late vendor engineer-design review approval	IF the vendor is late finalizing the design, or the design is unacceptable to SLAC THEN the fabrication schedule could be delayed while design revisions are completed	Langton	8/1/2008	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	40	Mitigate	5	Insure initial vendor buy in of timeline Closely track vendor progress during design stage Establish contact with sub-vendors to insure timely deliveries Complete periodic spot review of designs to insure suitability	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Unlikely 10-40%	Low	0	10	25	
R1.2-003	Sample goniometer-schedule delay due to late hardware fabrication-assembly	IF the vendor is late due to fabrication delays or assembly integration issues THEN the test and acceptance schedule could be delayed.	Langton	8/1/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Likely 40-80%	High	50	Mitigate	10	Request periodic status updates Start partial acceptance testing as soon as suitable sub-assemblies are completed. Utilize alternate temporary equipment which is currently available at SLAC for initial experiments	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Unlikely 10-40%	Low	0	10	25	
R1.2-004	Sample goniometer-schedule delay due to hardware technical requirements not met during vendor site acceptance testing	IF the vendor site testing and acceptance criteria are not met THEN there could be a schedule delay while the vendor redesigns and / or reworks the hardware	Langton	8/1/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Very Unlikely <10%	Low	25	Mitigate	10	Replace individually deficient element Temporarily immobilize deficient element Deploy interim hardware with reduced capability	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Very Unlikely <10%	Low	0	5	10	
R1.2-005	Sample goniometer-technical requirements not met	IF the hardware does not meet technical requirements THEN mitigation alternatives will have to be implemented	Langton	8/1/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Very Unlikely <10%	Low	25	Mitigate	0	Ensure complete design-engineer-built test process closely followed Ensure vendor qualified by prior experience Ensure all testing completed relevant environment / conditions. Investigate availability of alternative hardware	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Very Unlikely <10%	Low	0	5	10	

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R1.2-006	Sample goniometer-schedule delay due to changes to vendor requirements for support structure	IF the vendor revises requirements for this SLAC fabricated item THEN rework could delay testing schedule	Langton	6/24/2008	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	10	Mitigate	0	Insure requirements are reasonable and agreed prior to start fab Over specify requirements prior to fab	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	5	10	
R1.2-007	Detector mover-schedule delay due to late placement of PO to vendor	IF there is a delay in placing a PO with the / a vendor for the design build contract THEN the eng-design schedule could be delayed	Langton	6/24/2008	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Unlikely 10-40%	Low	10	Mitigate	0	Seek pre-approval of elements prior to BA Insure all stack holders are aware of status and their requirements are addressed prior to submission for approval Closely track document flow to insure timely sign-off / forwarding Release limited PO only covering eng-design phase	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Unlikely 10-40%	Low	\$0	5	10	
R1.2-008	Detector mover-schedule delay due to late vendor engineer-design review approval	IF the vendor is late finalizing the design, or the design is unacceptable to SLAC THEN the fabrication schedule could be delayed while design revisions are completed	Langton	8/1/2008	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	10	Mitigate	5	Insure initial vendor buy in of timeline Closely track vendor progress during design stage Establish contact with sub-vendors to insure timely deliveries Complete periodic spot review of designs to insure suitability	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	0	5	10	
R1.2-009	Detector mover-schedule delay due to late hardware fabrication-assembly	IF the vendor is late due to fabrication delays or assembly integration issues THEN the test and acceptance schedule could be delayed.	Langton	8/1/2008	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	10	Mitigate	10	Request periodic status updates Start partial acceptance testing as soon as suitable sub-assemblies are completed	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	0	5	10	
R1.2-010	Detector mover-schedule delay due to hardware technical requirements not met during vendor site acceptance testing	IF the vendor site testing and acceptance criteria are not met THEN there could be a schedule delay while the vendor redesigns and / or reworks the hardware	Langton	8/1/2008	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	10	Mitigate	10	Complete verification tests of relevant hardware Replace individually deficient element reduce payload mass as possible deploy interim hardware with reduced capability	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	0	5	10	

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															Best Case	Most Likely		Worst Case
R1.2-011	Detector mover-technical requirements not met	IF the hardware does not meet technical requirements THEN mitigation alternatives will have to be implemented	Langton	8/1/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	500	Mitigate	150	Ensure complete design-engineer-built test process closely followed Ensure vendor qualified by prior experience Ensure all testing completed relevant environment / conditions. Investigate availability of alternative Hardware	Marginal Scope/Technical: May require minor facility redesign or modification. Cost: impact consequence is >\$50K but <\$500K Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month	Unlikely 10-40%	Low	0	100	200	

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															Best Case	Most Likely		Worst Case	
R1.2-012	Detector (BNL) - schedule delay due to late MOU negotiation	IF there is a delay in MoU- TA negotiations THEN the eng-design schedule could be delayed	Van Bakel	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Early preparation of the yearly TA to the existing MoU to meet schedule.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	25		
R1.2-013	Detector (BNL) - schedule delay due to late hardware fabrication-assembly	IF the BNL is late due to fabrication delays or assembly integration issues THEN the test and acceptance schedule could be delayed.	Van Bakel	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	LDAC bi-annual review. Use existing Cornell prototype with reduced capability in interim.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	30		
R1.2-014	Detector (BNL) - technical requirements not met	IF the hardware does not meet technical requirements THEN mitigation alternatives will have to be implemented	Van Bakel	6/26/2008	Critical Scope/Technical: Considerable impact on project. Technical goals of project cannot be fully achieved. Cost: Estimated cost of impact consequence is >\$1M but <\$3M Schedule: Potential delay to L2 milestone is >3 months or L1 milestone is <3 mon	Unlikely 10-40%	Medium	2000	Mitigate	50	LDAC bi-annual review. Possibility to purchase commercial detectors with reduced capabilities. Alternative use of the existing cornell design.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	300		
1.3	Coherent X-ray Imaging Instrument (CXI)																		
R1.3-001	KB0.1 system is incompatible with 0.1 micron Sample Chamber	IF the KB0.1 system does not allow sufficient space for the sample chamber components THEN the focal length of the KB0.1 mirrors may need to be increased or a need to modify the chamber	P. Montanez	8/7/2008	Significant tech impact Loss of functionality Marginal Cost impact (>50K) Significant schedule impact L2M < 3months	Very Likely	High	1000	Accept and Mitigate	700	• Break the link between the KB0.1 mirrors and the chamber by building a second chamber to be used early with the KB1 system only (DONE)	Marginal tech impact Loss of functionality Low Cost impact (<50K) Negligible schedule impact	Likely	Medium	0	0	50		
R1.3-002	Vendor can't meet KB0.1 mirror specifications	IF the vendor informs LUSI that they cannot meet the KB0.1 mirror specs after the contract was awarded THEN there can be a significant loss of functionality	P. Montanez	8/7/2008	Significant tech impact Marginal Cost impact (>50K) Negligible schedule impact	Likely	High	200	Accept and Mitigate	20	• Start discussions with vendors early to guarantee their capabilities are consistent with our needs (DONE) • Travel to vendor site • Identify vendors with proven capabilities (DONE) • Utilize a vendor evaluation board	Marginal tech impact Marginal Cost impact (>50K) Negligible schedule impact	Likely	Medium	0	0	200		
R1.3-003	Vendor delivers KB0.1 mirrors that do not meet the specifications	IF the mirror vendor delivers mirrors for the KB0.1 system and the metrology reveals they do not meet the specifications THEN there can be a significant loss of functionality or additional costs	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact L3M < 3 months	Likely	Medium	100	Accept and Mitigate	20	• Travel to vendor sites during fabrication • Have a quality control person supervise their final fabrication process and final surface characterization • Build sufficient float in the schedule to allow extra vendor effort (DONE) • Identify vendors with proven capabilities	Marginal tech impact Marginal Cost impact (>50K) Negligible schedule impact	Unlikely	Low	0	0	100		
R1.3-004	No vendor is willing to bid on the KB1 mirrors	IF no vendor is found to make the high quality KB1 mirrors needed THEN a loss of functionality may occur	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact L2M < 3 months	Very Likely	Medium	300	Accept and Mitigate	0	• Start discussions with vendors early to guarantee their capabilities are consistent with our needs (DONE) • Iterate specs with vendors early to find a workable solution before bid process	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact L2M < 3 months	Likely	Medium	0	0	300		

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															Best Case	Most Likely		Worst Case
R1.3-005	No vendor is willing to bid on the KB1 mirror mechanical system	IF no vendor is found to make the mirror support system needed for the KB1 system THEN the work will have to be done in-house	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact L2M < 3 months	Very Likely	Medium	100	Accept and Mitigate	0	<ul style="list-style-type: none"> Begin vendor search early (DONE) Start discussions with vendors early to guarantee their capabilities are consistent with our needs Iterate specs with vendors early to find a workable solution before bid process 	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact L2M < 3 months	Likely	Medium	0	0	100	
R1.3-006	No experience with KB mirror mounting mechanics on LUSI team	IF no vendor can be identified for the KB1 mechanical system and the work must be done in-house THEN there could be extra costs and a loss of functionality due to the lack of experience of the LUSI team	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Significant schedule impact L2M < 3months	Unlikely	Medium	200	Accept and Mitigate	0	<ul style="list-style-type: none"> Leverage the experience from the HOMS mirrors of LCLS 	Low Tech Impact Marginal Cost impact (>50K) Marginal schedule impact	Unlikely	Low	0	100	200	
R1.3-007	45 degree KB geometry	IF the KB vendor is incapable of producing a KB system rotated by 45 degrees that meets the KB1 specs THEN loss of functionality may occur or a redesign of the Precision Instrument Stand will be required	P. Montanez	8/7/2008	Significant tech impact Marginal Cost impact (>50K) Negligible schedule impact	Very Likely	High	100	Accept and Mitigate	0	<ul style="list-style-type: none"> Start discussions with vendors early to guarantee their capabilities are consistent with our needs (DONE) Utilize a vendor evaluation board Require early design review of the mirror mechanics before proceeding with the stand design 	Significant tech impact Marginal Cost impact (>50K) Negligible schedule impact	Unlikely	Medium	0	100	100	
R1.3-008	Vendor can't meet KB1 mirror specifications	IF the vendor informs LUSI that they cannot meet the specs after the KB1 contract was awarded THEN there can be a significant loss of functionality	P. Montanez	8/7/2008	Significant tech impact Marginal Cost impact (>50K) Negligible schedule impact	Likely	High	200	Accept and Mitigate	20	<ul style="list-style-type: none"> Accept mirrors with reduced specs if performance impact is tolerable Accept extra costs to meet the specs if costs are not too high Start discussions with vendors early to guarantee their capabilities are consistent with our needs (DONE) Structure contract based on performance 	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact	Unlikely	Low	0	0	200	
R1.3-009	Vendor delivers KB1 mirrors that do not meet the specifications	IF the mirror vendor delivers mirrors for the KB1 system and the metrology reveals they do not meet the specifications THEN there can be a significant loss of functionality or additional costs and time	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Significant schedule impact L2M < 3 months	Likely	High	100	Accept and Mitigate	20	<ul style="list-style-type: none"> Travel to vendor sites during fabrication Have a quality control person supervise their final fabrication process and final surface characterization Build sufficient float in the schedule to allow extra vendor effort (DONE) Identify vendors with proven capabilities 	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact	Likely	Medium	0	0	100	
R1.3-010	Remote operation of commercial devices associated with the injector	IF it proves more difficult and time consuming than expected to modify commercial devices so they can be remotely controlled from outside the hutch THEN extra time and effort will be required	P. Montanez	8/7/2008	Significant tech impact Marginal Cost impact (>50K) Significant schedule impact L2M < 3months	Very Likely	High	200	Accept and Mitigate	0	<ul style="list-style-type: none"> Leverage PULSE efforts to solve this problem Move injector to a CD-4C deliverable (DONE) 	Marginal tech impact Marginal Cost impact (>50K) Negligible schedule impact	Unlikely	Low	0	100	200	
R1.3-011	No experience with particle injector on LUSI team	IF difficult challenges occur during the design THEN there could be extra costs and a loss of functionality due to the lack of experience with the injector technology of the LUSI engineering staff	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Significant schedule impact L2M < 3months	Unlikely	Medium	200	Accept and Mitigate	200	<ul style="list-style-type: none"> Hire an injector scientist with many years experience to oversee the design (DONE) Move injector to a CD4c deliverable (DONE) 	Negligible tech impact Marginal Cost impact (>50K) Negligible schedule impact	Unlikely	Low	0	100	200	X (07/23/2008)
R1.3-012	Injector does not meet the specs	IF injector design does not meet the particle beam focus and the throughput specs THEN there can be a significant loss of functionality	P. Montanez	8/7/2008	Significant tech impact Low Cost impact (<50K) Negligible schedule impact	Unlikely	Medium	0	Accept and Mitigate	200	<ul style="list-style-type: none"> Hire an injector scientist with many years experience to oversee the design (DONE) Leverage PULSE efforts to develop injector 	Significant tech impact Low Cost impact (<50K) Negligible schedule impact	Unlikely	Medium	0	0	0	
R1.3-013	Lack of information about the KB0.1 system	IF information about the exact design of the KB0.1 system is not available early THEN the schedule for the 0.1 micron sample chamber could slip	P. Montanez	8/7/2008	No tech impact Low Cost impact (<50K) Significant schedule impact L2M < 3months	Very Likely	High	0	Mitigate	0	<ul style="list-style-type: none"> Break the link between the KB0.1 mirrors and the chamber by building a second chamber to be used early with the KB1 system only (DONE) 	No tech impact Low Cost impact (<50K) Negligible schedule impact	Unlikely	Low	0	0	0	X (07/23/2008)

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															Best Case	Most Likely		Worst Case
R1.3-014	Custom stages for the Sample Chambers cannot be made	IF the custom stages used in the design and promised by a vendor cannot be made THEN the design of the 1 micron sample chamber will need to be updated with increased costs	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Marginal schedule impact L3M < 3 months	Likely	Medium	100	Accept and Mitigate	0	<ul style="list-style-type: none"> Constant communication with the vendors prior to and during design Discussions with other vendors with similar capabilities for backup solution 	Negligible Tech impact Marginal Cost impact (>50K) Marginal schedule impact L3M < 3 months	Unlikely	Low	0	50	100	
R1.3-015	Custom stages for the Detector Stage cannot be made	IF the custom stages used in the design and promised by a vendor cannot be made THEN the design of the detector stage will need to be updated with increased costs	P. Montanez	8/7/2008	Negligible Tech Impact Negligible Cost impact (<50K) Marginal schedule impact L3M < 3 months	Likely	Medium	50	Accept and Mitigate	0	<ul style="list-style-type: none"> Constant communication with the vendors prior to and during design Discussions with other vendors with similar capabilities for backup solution 	Negligible Tech impact Negligible Cost impact (<50K) Marginal schedule impact L3M < 3 months	Unlikely	Low	0	10	50	
R1.3-016	Changes to Cornell detector	IF last minute changes occur to the Cornell detector THEN a redesign of the detector stage, sample chambers and stands may be required	P. Montanez	8/7/2008	Marginal tech impact Marginal Cost impact (>50K) Negligible schedule impact	Likely	Medium	150	Accept and Mitigate	0	<ul style="list-style-type: none"> Write an ICD fixing the relevant design parameters at an early stage Delay the design of the detector stage until key parameters have been set 	Marginal tech impact Marginal Cost impact (>50K) Negligible schedule impact	Unlikely	Low	0	50	150	
R1.3-017	Delays due to undefined interfaces with other beamlines	IF the design criteria of the other beamlines (XCS and HED) change THEN some redesign may be required to fix possible problems	P. Montanez	8/7/2008	Marginal tech impact Loss of functionality Low Cost impact (<50K) Negligible schedule impact	Likely	Medium	50	Accept and Mitigate	0	<ul style="list-style-type: none"> Write an ICD fixing the relevant design parameters at an early stage Delay the design of the vacuum stands until key parameters have been set 	Marginal tech impact Loss of functionality Low Cost impact (<50K) Negligible schedule impact	Unlikely	Low	0	10	50	

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															Best Case	Most Likely		Worst Case
1.4	X-ray Correlation Spectroscopy Instrument (XCS)																	
R1.4-001	Diffractometer-schedule delay due to late placement of PO to vendor	IF there is a delay in placing a PO with the / a vendor for the design build contract THEN the eng-design schedule could be delayed	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Write Engineering Specification, Advanced Procurement Plan and Statement of Work in year prior to CD3. Schedule procurement cycle time with enough time for foreign procurement process. Integrate procurement cycle times into P3 schedule. Set milestones in P3 schedule to track progress of procurement process.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-002	Diffractometer-schedule delay due to late vendor engineer-design review approval	IF the vendor is late finalizing the design, or the design is unacceptable to SLAC THEN the fabrication schedule could be delayed while design revisions are completed	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Insure initial vendor buy in of timeline. Closely track vendor progress during design stage. Establish contact with sub-vendors to insure timely deliveries. Complete periodic spot review of designs to insure suitability.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-003	Diffractometer-schedule delay due to late hardware fabrication-assembly	IF the vendor is late due to fabrication delays or assembly integration issues THEN the test and acceptance schedule could be delayed.	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Require periodic status updates from vendor. Start partial acceptance testing as soon as suitable sub-assemblies are completed	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-004	Diffractometer-schedule delay due to hardware technical requirements not met during vendor site acceptance testing	IF the vendor site testing and acceptance criteria are not met THEN there could be a schedule delay while the vendor redesigns and / or reworks the hardware	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Very Unlikely <10%	Low	50	Mitigate	0	Replace individually deficient element Temporarily immobilize deficient element Deploy interim hardware with reduced capability	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-005	Diffractometer-technical requirements not met	IF the hardware does not meet technical requirements THEN mitigation alternatives will have to be implemented	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Very Unlikely <10%	Low	1000	Mitigate	0	Rigorously review design at each design review. Redesign / rebuild individually deficient element Temporarily immobilize deficient element Deploy interim hardware with reduced capability	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	0	250	

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															Best Case	Most Likely		Worst Case
R1.4-006	Large Angle Detector Mover-schedule delay due to late placement of PO to vendor	IF there is a delay in placing a PO with the / a vendor for the design build contract THEN the eng-design schedule could be delayed	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Write Engineering Specification, Advanced Procurement Plan and Statement of Work in year prior to CD3. Schedule procurement cycle time with enough time for foreign procurement process. Integrate procurement cycle times into P3 schedule. Set milestones in P3 schedule to track progress of procurement process.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-007	Large Angle Detector Mover-schedule delay due to late vendor engineer-design review approval	IF the vendor is late finalizing the design, or the design is unacceptable to SLAC THEN the fabrication schedule could be delayed while design revisions are completed	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Insure initial vendor buy in of timeline. Closely track vendor progress during design stage. Require preliminary and final design reviews. Establish contact with sub-vendors to insure timely deliveries.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-008	Large Angle Detector Mover-schedule delay due to late hardware fabrication assembly	IF the vendor is late due to fabrication delays or assembly integration issues THEN the test and acceptance schedule could be delayed.	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Require periodic status updates from vendor. Start partial acceptance testing as soon as suitable sub-assemblies are completed	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-009	Large Angle Detector Mover-schedule delay due to hardware technical requirements not met during vendor site acceptance testing	IF the vendor site testing and acceptance criteria are not met THEN there could be a schedule delay while the vendor redesigns and / or reworks the hardware	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Require reigorus revies of design prior to fabrication. Complete varification tests of relavent hardware at vendor site prior to delivery. Replace individually deficient element. Reduce payload mass as possible.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-010	Large Angle Detector Mover-technical requirements not met	IF the hardware does not meet technical requirements THEN mitigation alternatives will have to be implemented	Bong	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	1000	Mitigate	25	Rigorously review design at each design review. Redesign / rebuild individually deficient element. Implement advanced measurement / control hardware. Deploy interim hardware with reduced capability.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	250	

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															Best Case	Most Likely		Worst Case
R1.4-011	Detector (BNL) - schedule delay due to late MOU/TA negotiation	IF there is a delay in MoU negotiations THEN the eng-design schedule could be delayed	Van Bakel	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	Early re-negotiation of the existing MoU to meet schedule.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-012	Detector (BNL) - schedule delay due to late hardware fabrication-assembly	IF the BNL is late due to fabrication delays or assembly integration issues THEN the test and acceptance schedule could be delayed.	Van Bakel	6/26/2008	Significant Scope/Technical: Moderate impact on project technical performance. Cost: Estimated cost of impact consequence is >\$500K but <\$1M Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months	Unlikely 10-40%	Medium	50	Mitigate	0	LDAC bi-annual review. Use existing Cornell prototype with reduced capability in interim.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	50	
R1.4-013	Detector (BNL) - technical requirements not met	IF the hardware does not meet technical requirements THEN mitigation alternatives will have to be implemented	Van Bakel	6/26/2008	Critical Scope/Technical: Considerable impact on project. Technical goals of project cannot be fully achieved. Cost: Estimated cost of impact consequence is >\$1M but <\$3M Schedule: Potential delay to L2 milestone is >3 months or L1 milestone is <3 mon	Unlikely 10-40%	Medium	2000	Mitigate		LDAC bi-annual review. Possibility to purchase commercial detectors with reduced capabilities. Alternative use of the existing cornell design.	Negligible Scope/Technical: Minimal or negligible impact Cost: impact consequence is <\$50K Schedule: Slight potential schedule change, compensated by schedule float	Very Unlikely <10%	Low	0	15	250	

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															Best Case	Most Likely		Worst Case
1.5	X-Ray, Transport, Optics & Diagnostics System																	
1.5.3	Common Optics																	
R1.5-001	Monochromator Optical Stability	If the mechanical stability requirements can not be met due to the long distance between the mono and the experimental station, Then the vendor will have to redesign and/or rework the hardware causing a schedule delay.	E. Ortiz	7/31/2008	<p>Significant: Scope/Technical: Moderate impact on project technical performance. Can pose threat to project mission. Can require some facility redesign or repair, or change in technical performance.</p> <p>Cost: Estimated cost of impact consequence is >\$500K but <\$1M</p> <p>Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months</p>	Likely	High	1000	Mitigate	0	<p>Ensure requirements are clearly stated and agreed prior to award and fabrication</p> <p>Implement a stringent vendor selection process</p> <p>Implement regular visits to vendor</p> <p>Implement frequent and measurable status reports</p> <p>Maintain constant communication with the vendor prior to and during design and fabrication</p>	<p>Marginal Scope/Technical: Small reduction in project technical requirements or performance. May require minor facility redesign or modification.</p> <p>Cost: Estimated cost of impact consequence is >\$50K but <\$500K</p> <p>Schedule: Potential delay to L3 milestone is <3 months or L2 milestone is <1 month</p>	Unlikely	Low	0	100	500	
R1.5-002	Monochromator Delivery	If delivery of Monochromator is delayed or prohibited due to manufacturing challenges, problems or unforeseen setbacks. Then the delivery failure or delay of the Monochromator could delay the commissioning of the XCS experiment	E. Ortiz	7/31/2008	<p>Significant: Scope/Technical: Moderate impact on project technical performance. Can pose threat to project mission. Can require some facility redesign or repair, or change in technical performance.</p> <p>Cost: Estimated cost of impact consequence is >\$500K but <\$1M</p> <p>Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months</p>	Likely	High	1000	Mitigate	0	<p>Implement a stringent vendor selection process</p> <p>Implement regular visits to vendor</p> <p>Implement frequent and measurable status reports</p> <p>Maintain constant communication with the vendor prior to and during design and fabrication</p>	<p>Significant: Scope/Technical: Moderate impact on project technical performance. Can pose threat to project mission. Can require some facility redesign or repair, or change in technical performance.</p> <p>Cost: Estimated cost of impact consequence is >\$500K but <\$1M</p> <p>Schedule: Potential delay to L3 milestone is >3 months or L2 milestone is <3 months</p>	Unlikely	Low	0	100	1,000	

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															Best Case	Most Likely		Worst Case
1.6	Controls and Data Acquisition																	
R-1.6-001	Late changes to design due to evolving user requirements	IF there are major changes in the scope, performance, existence or placement of CXI/XPP/XCS instrumentation due to evolving user requirements...THEN, it will be difficult to meet the schedule and budget as specified in P3.	Gunther Haller	6/3/2008	Low technical risk Cost risk <\$50K Marginal Schedule Risk L2M delay<1 month	10%	Low	50	Mitigate	0	<ul style="list-style-type: none"> Adhere to BCR process. Participate in Experimental Area design process Release Engineering Requirement documents 	Low technical risk Cost risk <\$50K Marginal Schedule Risk L2M delay <1 month	5%	Low	0	25	50	

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															Best Case	Most Likely		Worst Case
							\$18,015		\$1,905					0	2,235	8,600		