

FULL FUNCTION DELIVERABLE - HIGH BANDWIDTH INTRA-BUNCH INSTABILITY FEEDBACK SYSTEMS Full function deliverable available for test after LS2														
Revision #1.3 J. Cesaratto, J. Fox, C. Rivetta, based on 1 full function deliverable and "supplied" SLAC labor rates														
Revision Date: 06/06/2012														
Brief Scope Description and Assumptions.														
	LS1	LS1				LS2				LS3				
	FY12 BASE	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	Total w/o Contingency	Contingency %	Total incl. Contingency
M&S Escalation		2.70%	5.47%	8.32%	11.24%	14.24%	17.32%	20.49%	23.74%	27.08%	30.51%			
Labor Escalation		0.80%	2.82%	5.39%	8.02%	10.72%	13.49%	16.33%	19.24%	22.16%	25.27%			
<b>DEVELOPMENT/EXPANSION of DEMONSTRATION PROCESSING SYSTEM</b>														
<b>M&amp;S</b>	<b>\$100,000</b>	<b>\$0</b>	<b>\$52,735</b>	<b>\$54,160</b>								<b>\$106,895</b>		<b>\$141,636</b>
Synchronization function for energy ramp	\$25,000	\$0	\$26,368									\$26,368	33%	\$34,937
Receiver channel development, prototype	\$25,000	\$0	\$26,368									\$26,368	33%	\$34,937
High bandwidth kicker power amplifiers, splitters/combiners	\$50,000	\$0	\$0	\$50,160								\$50,160	33%	\$71,702
Wideband slotline kicker prototype	\$62,500	\$64,188	\$65,919									\$130,106	33%	\$173,041
<b>LABOR</b>	<b>\$975,000</b>	<b>\$982,800</b>	<b>\$1,002,495</b>									<b>\$1,985,295</b>		<b>\$1,985,295</b>
Staff Scientist, 2 FTE	\$600,000	\$604,800	\$616,920									\$1,221,720	0%	\$1,221,720
Staff Engineer, 1 FTE	\$280,000	\$282,240	\$287,896									\$570,136	0%	\$570,136
Fellow/Postdoc, 1 FTE	\$180,000	\$181,440	\$185,076									\$366,516	0%	\$366,516
Graduate Student, 2 FTE (50% cost split with SLAC)	\$95,000	\$95,760	\$97,679									\$193,439	0%	\$193,439
<b>DESIGN STUDIES OF FULL-FUNCTION PROTOTYPE, SIMULATIONS, MDs with 1 bunch Demo</b>														
<b>M&amp;S</b>	<b>\$175,000</b>			<b>\$108,320</b>	<b>\$83,430</b>							<b>\$191,750</b>		<b>\$254,069</b>
High power amplifiers for SPS/MD evaluation	\$25,000			\$81,240	\$90							\$81,240	33%	\$107,643
RFC components, control equipment for kicker and power amplifiers	\$25,000			\$27,080	\$0							\$27,080	33%	\$35,881
High capacity processing channel development, 2nd FPGA platform for development	\$75,000			\$0	\$83,430							\$83,430	33%	\$110,545
<b>LABOR</b>	<b>\$1,120,000</b>			<b>\$1,180,368</b>	<b>\$1,209,824</b>							<b>\$2,390,192</b>		<b>\$2,868,230</b>
Staff Scientist, 2.25 FTE	\$675,000			\$711,383	\$729,135							\$1,440,518	20%	\$1,728,621
Staff Engineer, 1.25 FTE	\$350,000			\$368,865	\$378,070							\$746,935	20%	\$896,322
Fellow/Postdoc, 1.5 FTE	\$270,000			\$284,553	\$291,654							\$576,207	20%	\$691,448
Graduate Student, 2 FTE	\$95,000			\$100,121	\$102,619							\$202,740	20%	\$243,287
<b>DESIGN and FABRICATION OF A FULL-FUNCTION DELIVERABLE with CONTROL INTERFACE</b>														
<b>M&amp;S (cost per system, based on one system)</b>	<b>\$710,000</b>					<b>\$391,272</b>	<b>\$519,141</b>					<b>\$910,413</b>		<b>\$1,365,620</b>
Front end hybrid and beam motion receiver	\$50,000					\$57,120	\$0					\$57,120	50%	\$85,680
Orbit-offset and dynamic range preservation processor	\$30,000					\$34,272	\$0					\$34,272	50%	\$51,408
Front end variable delay and timing alignment	\$20,000					\$0	\$23,464					\$23,464	50%	\$35,196
Timing and synchronization system for interface to accelerator	\$20,000					\$11,424	\$11,732					\$23,156	50%	\$34,734
FPGA signal processing channel (logic processing functions)	\$100,000					\$0	\$117,320					\$117,320	50%	\$175,980
Front end A/D system for 4 GS/s rate	\$20,000					\$0	\$23,464					\$23,464	50%	\$35,196
Back end D/A system for 4 GS/s operation	\$20,000					\$0	\$23,464					\$23,464	50%	\$35,196
Back end low level distribution, band split, fanout and timing distribution chassis	\$40,000					\$0	\$46,928					\$46,928	50%	\$70,392
Back end power amplifiers, A low band: 100 W each	\$100,000					\$0	\$117,320					\$117,320	50%	\$175,980
Back end power amplifiers, A high band: 100 W each	\$160,000					\$182,784	\$0					\$182,784	50%	\$274,176
High power couplers, monitoring, and diagnostic mix subsystem	\$40,000					\$0	\$46,928					\$46,928	60%	\$70,392
User interface processor and firmware for operator	\$35,000					\$19,992	\$20,531					\$40,523	50%	\$60,785
Critical spare components for operation	\$25,000					\$85,680	\$87,990					\$173,670	50%	\$260,605
<b>OPTIONAL ITEMS (cost per system, based on one system)</b>	<b>\$570,000</b>					<b>\$314,160</b>	<b>\$346,094</b>					<b>\$660,254</b>		<b>\$990,381</b>
Tunnel cables, high and low power	\$25,000					\$0	\$29,330					\$29,330	50%	\$43,995
Tunnel racks, cooling, and power distribution, monitoring	\$20,000					\$0	\$23,464					\$23,464	50%	\$35,196
Pickup structure (including feedthroughs and vacuum structure)	\$75,000					\$85,680	\$0					\$85,680	50%	\$128,520
Low band kicker assemblies (including feedthroughs - 2 each and vacuum structure)	\$200,000					\$228,480	\$0					\$228,480	50%	\$342,720
High band kicker assemblies (including feedthroughs - 2 each and vacuum structure)	\$250,000					\$0	\$293,300					\$293,300	50%	\$439,950
<b>LABOR</b>	<b>\$1,255,000</b>					<b>\$1,389,536</b>	<b>\$1,424,300</b>	<b>\$878,292</b>				<b>\$3,692,127</b>		<b>\$5,168,978</b>
Staff Scientist, 2 FTE	\$600,000					\$664,320	\$680,940	\$523,485				\$1,868,745	40%	\$2,616,243
SLAC Staff Engineer, 2 FTE	\$560,000					\$620,032	\$635,544	\$244,293				\$1,499,869	40%	\$2,099,817
CERN Staff Engineer	\$280,000					\$310,016	\$317,772	\$162,862				\$790,650	40%	\$1,106,910
Fellow/Postdoc, 1.5 FTE	\$270,000					\$298,944	\$306,423	\$209,394				\$814,761	40%	\$1,140,665
Graduate Student, 2 FTE	\$95,000					\$105,184	\$107,816	\$110,514				\$323,513	40%	\$452,918
<b>TRAVEL (By year with escalation (labor rate) and overhead)</b>	<b>\$42,500</b>	<b>\$65,365</b>	<b>\$66,224</b>	<b>\$67,316</b>	<b>\$68,434</b>	<b>\$73,674</b>	<b>\$74,921</b>	<b>\$76,199</b>				<b>\$492,131</b>		<b>\$492,131</b>
<b>Total (for 1 delivered full-function system), no CERN contribution</b>		<b>\$1,293,793</b>	<b>\$1,372,448</b>	<b>\$1,694,717</b>	<b>\$1,653,342</b>	<b>\$2,777,602</b>	<b>\$2,988,650</b>	<b>\$1,326,746</b>				<b>\$13,107,297</b>		<b>\$16,571,879</b>
<b>Total (for 1 delivered system to the SPS), w/CERN contribution</b>		<b>\$1,048,165</b>	<b>\$1,121,454</b>	<b>\$1,410,164</b>	<b>\$1,361,688</b>	<b>\$1,854,482</b>	<b>\$2,018,361</b>	<b>\$954,490</b>				<b>\$9,768,803</b>		<b>\$12,275,958</b>
<b>LABOR RATES: (Including benefits and 53% indirect)</b>														
Staff Scientist	\$300,000													
Staff Engineer	\$280,000													
Postdoc	\$180,000													
Graduate Student (50% LARP, 50% SLAC ARD support)	\$95,000													
M&S overhead rate 7.65% per Cole Carter														7.65%
Travel overhead rate at the G&A labor rate of 53%														53%
<b>NOTES:</b> Lines highlighted in peach correspond to potential CERN contribution Lines highlighted in green correspond to LARP contribution Lines highlighted in white correspond to cost split proportion of CERN contribution Contingency categories listed in proposal document, % here are averaged over assigned line tasks Travel costs escalated with labor rate. What is travel escalation rate? CERN costs estimated using typical US Lab costs. Total, CERN contribution assumes CERN provides for the OPTIONAL ITEMS (e.g., vacuum kickers, pickups, cabling, etc.) CERN Fellow/Postdoc (E.g., K. LI) works on mix of simulation and hardware development Graduate students 50% LARP, 50% ARD SLAC support Lab test equipment and lab support costs need GARD contribution - TBD <b>Total SLAC contribution (for graduate student support over program lifetime): \$1,779,289</b>														