U.S. DEPARTMENT OF ENERGY

FIELD WORK PROPOSAL

1. WORK PROPOSAL NO.:	2. REVISION NO.:	3. DATE PREPARED:
JLAB-HEP-XX	1	2/06

4. WORK PROPOSAL TITLE:	5. BUDGET AND REPORTING CODE:
ILC CRYOMODULE VALUE ENGINEERING	

6. WORK PROPOSAL TERM: Two years

7. HEADQUARTERS OFFICE PROGRAM MANAGER:	8. HEADQUARTERS ORGANIZATION:
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9. DOE FIELD ELEMENT WORK PROPOSAL REVIEWER:	10. DOE FIELD ELEMENT:
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11. CONTRACT WORK PROPOSAL MANAGER:	12. CONTRACTOR NAME:
Swapan Chattopadhyay, (757) 269-7001 swapan@jlab.org	Southeastern Universities Research Association, Inc., Thomas Jefferson National Accelerator Facility (Jefferson Lab)

13. Work Proposal Description

Principal Investigators: E. Daly, R. Rimmer, J, Preble

This Field Work Proposal addresses the International Linear Collider cryomodule development effort and cryomodule component R&D activities. In particular it addresses potential cost savings in the cryomodule assembly, coupler and tuner. The funding for this effort, to be distributed from ILC funds, is at a level of $200k for the FY2007 budget with the option for continuation at the level of $300k in FY2008.

14. CONTRACTOR WORK PROPOSAL MANAGER	15. OPERATIONS OFFICE REVIEW OFFICIAL
Signature Date	Signature Date

16. DETAIL ATTACHMENTS

____ a. Facility Requirements	____ f. Technical Progress	_x_ k. Deliverables
____ b. Publications	____ g. Future Accomplishments	____ l. Performance measures/expectations
_x_ c. Purpose	_x_ h. Relationships to Other Projects	____ m. ES&H Considerations
____ d. Background	____ i. NEPA Projects	____ n. Human/Animal Subjects
_x_ e. Approach	____ j. Milestones	____ o. Other (Specify)

WORK PACKAGE REQUIREMENTS FOR OPERATING/EQUIPMENT
OBLIGATIONS AND COSTS

CONTRACTOR NAME:	WORK PROPOSAL #:	REV. #:	DATE PREPARED:
Southeastern Universities Research Association, Inc. Thomas Jefferson National Accelerator Facility (Jefferson Lab)	JLAB-HEP-XX	1	2/06

	FY 2006 Allocated	FY 2007 Target	FY2008 Target	FY 2007 Requirements	FY 2007 Authorized
17. STAFFING (IN STAFF YEARS)					
a. SCIENTIFIC		0.50	0.80		
b. OTHER DIRECT		0.25	0.20		
c. TOTAL DIRECT		0.75	1.00		
18. OPERATING EXPENSE (in thousands)					
a. TOTAL OBLIGATIONS (B/A)		200	300		
b. TOTAL COSTS (B/O)		200	300		
19. EQUIPMENT (in thousands)					
a. EQUIP OBLIGATIONS (B/A)					
b. EQUIPMENT COSTS (B/O)					

20. MILESTONE SCHEDULE (Tasks)	Dates	Proposed $	Authorized $
Cryomodule value engineering studies	Sept 07	50k	
Participate in GDE baseline costing exercise	Sept 07	30k	
1.3 GHz alternative coupler evaluation	Sept 07	60k	
1.3 GHz alternative tuner evaluation	Sept 07	60k	
1.3 GHz alternative coupler prototype	Sept 08	150k (FY08)	
1.3 GHz tuner prototype	Mar 08	120k (FY08)	
1.3 GHz tuner cold test	Sept 08	30k (FY08)	

21. REPORTING REQUIREMENTS (Description):

TITLE:	BUDGET AND REPORTING CODE	DATE PREPARED
ILC CRYOMODULE VALUE ENGINEERING		7/05
WP NUMBER	CONTRACTOR NAME:	
JLAB-HEP-XX	Southeastern Universities Research Association, Inc., Thomas Jefferson National Accelerator Facility (Jefferson Lab)	

16. c. Purpose

The work described here is done under the guidance of the US ILC collaboration in coordination with the goals and activities of the international GDE. The purpose is to contribute JLab's long experience of cryomodule engineering and assembly to the process of determining the realistic cost of the ILC baseline design and to explore areas that may yield significant cost savings. These will be factored into the ILC next generation cryomodule design effort proposed by FNAL.

16. e. Approach

JLab scientists and engineers will participate in the ILC baseline cost estimating exercise. The research personnel involved are Joe Preble, Ed Daly and Mark Wiseman.

JLab scientists and engineers will evaluate the existing cryomodule design with an eye to potential cost savings and possible improvements in construction or reliability. In particular the cryogenic system, RF power coupler, tuner and overall method of assembly will be examined and alternatives will be explored.

JLab scientists and engineers will evaluate alternative fundamental power coupler option based on the proven SNS type high-power coaxial feedthrough and the possibility of adapting the high-power waveguide FPC and window being developed for the JLab Ampere-class cryomodule project to 1.3 GHz. Test models will be made to evaluate these options as appropriate. If attractive a pair of high-power prototype 1.3 GHz couplers would be fabricated at JLab in FY08 for testing elsewhere.

JLab scientists and engineers will evaluate alternative tuner designs based on the JLab 12 GeV upgrade design and our experience with SNS, FEL and original CEBAF designs. These may offer cost savings through simplicity and reduction in number of parts. We will also factor in the desire for microphonic control through passive methods and active feedback. A prototype tuner could be fabricated and tested at 2K at JLab in FY08. Promising designs could be evaluated under realistic operating conditions in the JLab Horizontal Test Bed (HTB). The research personnel involved are Ed Daly, Robby Hicks, Joe Preble, Bob Rimmer, Mircea Stirbet, Haipeng Wang and Genfa Wu.

16. h. Relationships to Other Projects

This work will be done in collaboration with, and be complementary to, the FNAL next generation ILC cryomodule design study. The work benefits greatly from the JLab's investment in the 12 GeV upgrade cryomodule and component designs and the ongoing FEL high-current cryomodule design exercise.

16. k. Deliverables

The cryomodule value engineering exercise will deliver technical evaluations of the existing cryomodule and component designs and alternatives and quantify the potential cost-saving opportunities and any implied technical trade-offs.

In FY08 promising alternative designs will be prototyped and tested at JLab or elsewhere.