

CESR General Operations high level WBS				All activities related to providing reliable beams for the relevant programs, including CLEO, CHESS, CesrTA.	
Project Code	Task Code	Cap	Description	Approvals	Description of work
GEN_1			Gun & Linac	S. Greenwald	
	GEN_1.1	n	Gun & Linac Labor		Maintenance, repair, administrative work such as spares tracking, ordering parts, rfp's for the gun, injector, linac and transport lines up to but not including the inflector magnets. If significant time is spent tuning these elements it should be included here also.
GEN_2			Synchrotron	D. Rice	
	GEN_2.1	n	Synchrotron Labor		Maintenance, repair, administrative work such as spares tracking, ordering parts, rfp's for the synchrotron from the injection inflector magnets to the exit port to the transfer lines, including magnets, RF, vacuum, instrumentation subsystems. If significant time is spent tuning these elements it should be included here also.
GEN_3			Storage Ring	M. Billing	
	GEN_3.1	n	Storage Ring Labor		Maintenance, repair, administrative work such as spares tracking, ordering parts, rfp's for the storage ring including magnets, RF, vacuum, instrumentation subsystems. Tuning on the storage ring to restore satisfactory operation should be assigned here. Minor tuning of injector systems may also be included here.
GEN_4			Transfer Lines	M. Billing	
	GEN_4.1	n	Transfer Lines Labor		Maintenance, repair, administrative work such as spares tracking, ordering parts, rfp's for the Synchrotron-to-CESR transport lines from the synchrotron exit port to the entrance flange into CESR, including magnets, vacuum, instrumentation subsystems. NOTE: Time spent tuning in the transfer line should be assigned to Storage Ring.
GEN_5			X-ray Lines	Y. Li	
	GEN_5.1	n	X-ray Lines Labor		Maintenance, repair, administrative work such as spares tracking, ordering parts, rfp's for the X-ray transport lines from the CESR exit flange to Cave generally including vacuum systems, instrumentation, and supports.
GEN_6			Utilities	R. Gallagher	
	GEN_6.1	n	Utilities Labor		Repairs, maintenance, coordination with CU Facilities for water, electric, air, steam and other general utility systems for Wilson Lab. Includes cooling towers, pumps, water treatment, drainage systems, fire detection systems.
GEN_7			Building & Shop	R. Gallagher	
	GEN_7.1	n	Building & Shop Labor		Maintenance, repairs, organization, coordination with CU Facilities of general building and shop areas. Includes rigging, crane work, materials handling.
GEN_8			Genl Oprns & Safety	R. Gallagher	
	GEN_8.1	n	Genl Oprns & Safety Labor		Includes safety programs, training, accelerator scheduling, operations, operators, work unit meetings, radiation badges, monitors, 24V interlocks, etc. Routine tuning of CESR and injectors while delivering beam in normal operations should be captured here.
GEN_9			Computing	R. Helmke	General computing support services, including server, desktop/laptop, network setup & maintenance and consulting. Accelerator and HEP Group project effort to be separately tracked.
	GEN_9.1	c	LEPP Capital Labor		Includes all capitalized effort on LEPP general-purpose computing and network hardware. Capital effort on project-driven systems to be separately tracked.
	GEN_9.2	n	LEPP Maint Labor		Includes all non-capital maintenance of general LEPP computers and networks
	GEN_9.3	n	CESR Maint Labor		Includes all non-capital maintenance of CESR computers and networks
	GEN_9.4	n	ERL Maint Labor		Includes all non-capital maintenance of ERL computers and networks
	GEN_9.5	n	HEP Grp Maint Labor		Includes all non-capital maintenance of HEP Group computers and networks
GEN_10			Cryogenics	R. Gallagher	Includes LHe refrigerators and distribution equipment and LN storage and distribution equipment. Also includes boil-off equipment but not GN distribution (Utilities).
	GEN_10.1	n	General Cryo System Labor		General cryo system work on equipment, services common to CESR, ERL, and any other project
	GEN_10.2	n	CESR Cryo Components Labor		Cryo system work on equipment serving CESR for general operations.
GEN_11			Admin/Management	D. Rice	
	GEN_11.1	n	Admin/Management Labor		Record keeping, lab management, administrative meetings, annual performance reviews, proportioned external activities (reviews, referee, talks, etc.) Explain in COMMENTS box.
GEN_12			CESR Capital Upgrades	D. Rice	
	GEN_12.1	c	CESR Capital Upgrades Labor		Any capital upgrades to the CESR accelerator complex that are not part of the CesrTA or other programs. Should be rarely if ever used. Explain in comments box.

ERL1a Operations - high level WBS				All activities related to installation, commissioning, and ERL R&D activities on the L0 injector test accelerator	
Project Code	Task Code	Cap	Description	Approvals	Description of work
ERL_1			Electron Gun	K. Smolenski	
	ERL_1.1	c	Gun Design		R&D, Design and testing of concepts for improvements to the high voltage electron gun & cathode processing
	ERL_1.2	c	Gun EFI&C		Electron gun, cathode, power supply systems upgrades and modifications
	ERL_1.3	n	Gun Maintenance		Routine tuning, troubleshooting & repairs to gun, cathode processing, & power supply
ERL_2			Laser Systems	D. Ouzounov	
	ERL_2.1	c	Laser Systems Design		R&D and design studies of new and improved laser systems for the ERL injector
	ERL_2.2	c	Laser EFI&C		Laser system upgrades and modifications
	ERL_2.3	n	Laser Maintenance		Routine tuning, troubleshooting & repairs to laser related systems
ERL_3			RF Systems	S. Belomestnykh	
	ERL_3.1	c	RF Design		R&D, design and testing of concepts for improvements to the RF power and controls for the ERL injector. Design studies of SRF cavities and cryomodules for the ERL injector
	ERL_3.2	c	RF EFI&C		RF systems commissioning, modifications and improvements for injector operations
	ERL_3.3	n	RF Maintenance		Routine tuning, troubleshooting & repairs to RF systems
ERL_4			Beam Diag & Instr.	I. Bazarov	
	ERL_4.1	c	Instrumentation Design		Beam instrumentation R&D, design, & upgrade for phase space and beam dynamics measurements
	ERL_4.2	c	Instr. EFI&C		Commissioning and production of beam instrumentation systems and upgrades for phase space and beam dynamics measurements
	ERL_4.3	c	Instr. Commissioning		Characterization of beam instrumentation and validation of performance specifications
	ERL_4.4	n	Instr. Maintenance		Routine calibration, troubleshooting and repair of beam diagnostic and instrumentation systems.
ERL_5			ERL Experimental Program	I Bazarov	
	ERL_5.1	c	Beam Optics Design		Optics design studies for the ERL injector including linear, non-linear, and space charge effects. Writing codes for optics calculation and analysis.
	ERL_5.2	c	Beam Commissioning		Beam studies and model validation. Loading of beam optics into hardware, measurement and correction of optics, linear and non-linear measurements and corrections.
	ERL_5.3	n	Experimental program		Measurement, tuning, general accelerator design to achieve program objectives.
ERL_6			Electronics & power conversion	J. Barley	
	ERL_6.1	c	Control Hardware EFI&C		Control hardware (including control system computers and networking) and electronics modifications to support ERL injector modifications
	ERL_6.2	c	Mag & PS EFI&C		Magnet construction, installation, modifications and power supply installation, commissioning, and upgrades for injector operations
	ERL_6.3	c	Equipment Safety		Installation, upgrades and modifications to the equipment protection system for the ERL injector
	ERL_6.4	c	Electronics Commissioning		Characterization of magnet and electronics operations and validation of performance specifications
	ERL_6.5	n	Control hardware maintenance		Routine maintenance, troubleshooting, and repair of control system and equipment safety hardware.
	ERL_6.6	n	Magnet and power supply maintenance		Routine maintenance, troubleshooting, and repair of magnets and power supplies.
ERL_7			Vacuum	Y. Li	
	ERL_7.1	c	Vacuum EFI&C		Vacuum system design, fabrication, and testing of modifications, vacuum instrumentation and diagnostics, including beam dumps.
	ERL_7.2	c	Beam Dumps		Upgrades and modifications for the ERL injector beam dumps
	ERL_7.3	n	Vacuum maintenance		Routine monitoring, troubleshooting, and repairs to vacuum components, instrumentation, and beam dumps.
ERL_8			Genl Oprns & Safety	B. Dunham	
	ERL_8.1	n	Genl Oprns & Safety		All activities related to providing reliable beam operation for the ERL Phase 1A injector. Includes ERL specific safety programs, training, accelerator scheduling, operations, operators, work unit meetings, monitors, 24V interlocks, etc.
	ERL_8.2	c	EFI&C PPS & Safety		Design, engineering, fabrication, installation, and commissioning of the ERL Personnel Protection System (wiring, radiation monitors, light beams, signs) and radiation shielding.
ERL_9			Technical Support	R. Gallagher	
	ERL_9.1	n	Building & Shop		Maintenance, repairs, organization, coordination with CU facilities of general building and shop areas for the ERL specific needs.
	ERL_9.2	n	Utilities		Repairs, maintenance, coordination with CU facilities for water, electric, air, steam and other general utility systems for the ERL specific needs
ERL_10			Control system Software	J. Dobbins	
	ERL_10.1	c	Codes, database, screens		Includes writing, fixing, improving computer codes, databases, entering data into databases, generating screens, initial work and upgrades to system. Control system software development, EPICS support and modifications
	ERL_10.2	n	Software Maintenance		Support for maintaining and operating the EPICS control system for the ERL injector.
ERL_11			Cryogenics	D. Widger	
	ERL_11.1	c	ERL Cryo upgrade		Includes all design, construction, installation and testing of cryogenics work for ERL for initial installation or for operational improvements.
	ERL_11.2	n	ERL cryo maintenance		Includes troubleshooting and repair of ERL cryo systems and maintaining supply of LN or other expendable cryogens.
ERL_12			Survey	S. Chapman	
	ERL_12.1	c	Alignment & Upgrade		Initial alignment and surveying for the injector. Improving alignment. Acquisition of new equipment.
	ERL_12.2	n	Alignment maintenance		Routine survey and realignment of ERL test injector.
ERL_13			Admin/Management	B. Dunham	
	ERL_13.1	n	Admin/Management Labor		ERL specific record keeping, management, administrative meetings, ERL related external activities (reviews, referee, talks, etc.) Explain in COMMENTS box.

CesrTA - high level WBS				All activities related to management and planning for the CesrTA Research Program as well as interface activities extending outside the laboratory (including ILC GDE interactions, laboratory outreach, etc.)	
Project Code	Task Code	Cap	Description	Approvals	Description of work
CTA_1			Project Administration & External	M. Palmer	
	CTA_1.1	n	Research Program Management		<i>Coordination of R&D plans, safety plan development, coordination of activities with other CLASSE projects and with collaborators, and project oversight</i>
	CTA_1.2	n	External Activities		<i>ILC GDE and ILC ART participation, CLASSE outreach, KEK-ATF collaboration, etc.</i>
CTA_2			Accelerator Design	D. Rubin	
	CTA_2.1	c	Optics Design		<i>Optics design for the CesrTA configuration (1.5-5.3 GeV)</i>
	CTA_2.2	c	Beam Dynamics		<i>Studies of single- and multi-particle dynamics, low emittance tuning requirements, and low emittance machine specifications</i>
			Engineering, Design, Fabrication, Installation & Commissioning		
CTA_3.1	CTA_3.1	c	EFI&C Align & Survey	S. Chapman	<i>Alignment and survey upgrades for low emittance operation of CESR</i>
CTA_3.2			EFI&C Beam Instr.	M. Billing	
	CTA_3.2.1	c	BPM		<i>CESR BPM upgrade for turn-by-turn 4ns bunch train operation</i>
	CTA_3.2.2	c	BSM		<i>Transverse visible light profile monitor upgrade for CesrTA parameters</i>
	CTA_3.2.3	c	Streak Camera		<i>Longitudinal visible light profile monitor upgrade for CesrTA parameters</i>
	CTA_3.2.4	c	XBSM		<i>High resolution, fast (single-pass) x-ray beam profile monitor upgrade</i>
	CTA_3.2.5	c	DAQ		<i>Data acquisition system upgrades for use with new beam instrumentation (BPM, BSM, xBSM)</i>
	CTA_3.2.6	c	General Diag.		<i>Miscellaneous beam instrumentation modifications</i>
CTA_3.3	CTA_3.3	c	EFI&C Contr & Electronics	J. Barley	<i>Control hardware (including control system computers and networking) and electronics modifications to support CESR ring and instrumentation modifications</i>
CTA_3.4	CTA_3.4	c	EFI&C Cryogenics	D. Sabol	<i>Cryogenics system modifications</i>
CTA_3.5	CTA_3.5	c	EFI&C Feedback Sys.	M. Billing	<i>Transverse and longitudinal feedback system upgrades for 4 ns bunch train operation</i>
CTA_3.6	CTA_3.6	c	EFI&C Mag & PS	J. Barley	<i>Magnet modifications and power supply upgrades for low emittance configuration/operations</i>
CTA_3.7	CTA_3.7	c	EFI&C Software	D. Sagan	<i>Control system software development, analysis software development and code support system development</i>
CTA_3.8	CTA_3.8	c	EFI&C CESR RF	J. Sikora	<i>RF modifications and improvements for CesrTA operations</i>
CTA_3.9			EFI&C Vacuum	Y. Li	
	CTA_3.9.1	c	EC Diag		<i>Development of retarding field analyzers and other diagnostics for characterizing electron cloud development in standard CESR vacuum chambers and various test chambers</i>
	CTA_3.9.2	c	EC chambers		<i>Design, fabrication and installation of upgraded CESR vacuum chambers incorporating EC diagnostics and mitigation techniques.</i>
	CTA_3.9.3	c	CESR Vac Sys		<i>General vacuum system modifications in support of the CesrTA research program</i>
	CTA_3.9.4	c	L0 Photon Stop		<i>Development of a photon beam stop for 5 GeV wiggler operation</i>
	CTA_3.9.5	c	X-ray Beamlines		<i>CHESS beamline modifications associated with installation of X-ray beam profile monitors for use with positron and electron beams</i>
CTA_3.10	CTA_3.10	c	EFI&C CesrTA	R. Gallagher	<i>General CESR and injector modifications for the CesrTA research program</i>
CTA_3.11		n	CLEO IR Removal	J. Kandaswamy	<i>Partial CLEO removal in support of the CesrTA low emittance program</i>
CTA_4			Beam Commissioning	M. Billing	
	CTA_4.1	c	Beam Instr.		<i>Beam characterization of upgraded instrumentation and validation of the performance specifications</i>
	CTA_4.2	c	Feedback Systems		<i>Beam characterization of upgraded feedback systems and validation of the performance specifications</i>
	CTA_4.3	c	Mag. & PS		<i>Beam characterization of impact of magnet and power system modifications and validation of the performance specifications</i>
	CTA_4.4	c	CESR RF		<i>Beam characterization of SRF system operation and validation of performance specifications</i>
	CTA_4.5	c	Vacuum Diag.		<i>Beam characterization of the upgraded vacuum diagnostics and validation of the performance specifications</i>
	CTA_4.6	c	Ring Commissioning		<i>General commissioning of the upgraded CESR ring and injector systems</i>
CTA_5			Accel. Research	M. Palmer	
	CTA_5.1	n	Opt. Corr. & LET		<i>Program to achieve and characterize ultra low emittance CesrTA operation</i>
	CTA_5.2	n	EC R&D		<i>Electron cloud growth, suppression, and beam dynamics program</i>
	CTA_5.3	n	IBS		<i>Studies of intrabeam scattering effects in support of beam dynamics program</i>
	CTA_5.4	n	Other R&D		<i>Miscellaneous accelerator R&D</i>
CTA_6			CesrTA Maintenance	D. Rice	
	CTA_6.1	n	Beam Instr.		<i>Maintenance activities for CesrTA-only beam instrumentation</i>
	CTA_6.2	n	Feedback Systems		<i>Maintenance activities for CesrTA-only feedback hardware</i>
	CTA_6.3	n	Mag. & PS		<i>Maintenance activities for CesrTA-only magnets and power supplies</i>
	CTA_6.4	n	Vacuum Diag.		<i>Maintenance activities for CesrTA-only electron cloud diagnostics</i>

EFI&C = Engineering, Fabrication, Installation & Commissioning

Other Account Reporting Lines					Activities for SC RF, ERL Phase II, and High Energy Physics
Project Code	Task Code	Cap	Description	Approvals	Description of work
SRF_			Superconducting RF R&D	H. Padamsee	
	SRF_1	?	SRF Pilot		<i>SRF R&D under cooperative extension</i>
	SRF_2	?	Proj X		<i>SRF R&D under Project X support (via CsrTA)</i>
	SRF_3	n	SRF 2008		<i>SRF R&D under NSF funding 2008</i>
	SRF_4	n	Fermilab-ILC		
	SRF_5	n	DOE		
	SRF_6	n	SRF Facilities		<i>General SRF facilities work at Newman Lab such as maintenance and repairs to Clean Rooms, Pits, pumping system, etc that are used by all the SRF projects.</i>
ERL2_			ERL Phase II	supervisors	
	ERL2_1	c	Accel Phys & Engr&Design		<i>Accelerator Physic studies, advanced engineering for ERL Phase II</i>
	ERL2_2	c	ERL TDR 2008		<i>TDR preparation ERL Phase II 2008</i>
HEP_			High Energy Physics	J. Alexander	CLEO continuing data analysis
	HEP_1	n	HEP General		<i>(University)</i>
	HEP_2	n	CLEO Completion		<i>CLEO continuing data analysis</i>
	HEP_3	n	CMS		<i>Particle Physics at the energy frontier with CMS (NSF)</i>
	HEP_4	n	OSG dCache		
			HEP_5 CMS DBS-UCLA/NSF		
	HEP_5.1	n	CMS S&C - DBS		<i>CMS DBS-UCLA/NSF</i>
	HEP_5.2	n	CMS S&C - Event Display		<i>CMS DBS-UCLA/NSF</i>
	HEP_5.3	n	CMS S&C - Infrastructure		<i>CMS DBS-UCLA/NSF</i>
	HEP_6	n	Energy Frontier DBS		<i>Scientific workflow management & energy frontier physics (Wittich)</i>
	HEP_7	n	Fermilab Jones		
CHS	CHS_1	n	CHES program	D. Bilderback	<i>Work specific to CHES program activities</i>