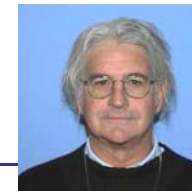




September 24-25, 2007



ILC Electron Systems Engineering Design Kick Off Meeting

Stanford Linear Accelerator Center

Planning for the EDR, Part Two

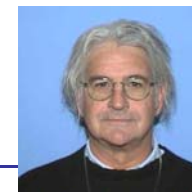
J. C. Sheppard

SLAC

September 24, 2007



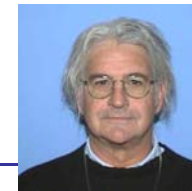
Nominal Source Parameters



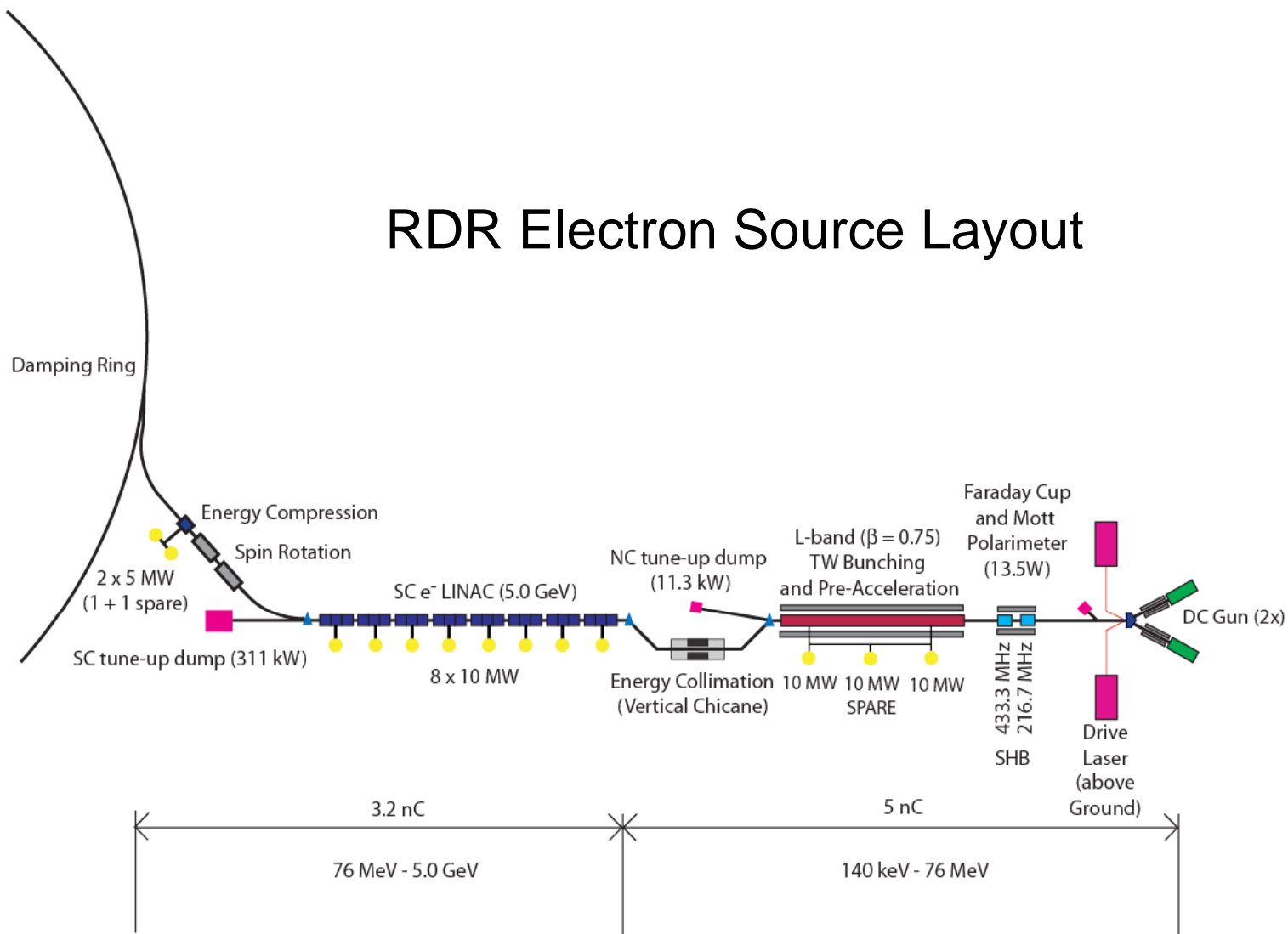
| Parameter | Symbol | Value | Units |
|-----------------------|-----------|--------------------|-------|
| Bunch Population | N_b | 2×10^{10} | # |
| Overhead Factor | F | 1.5 | # |
| Bunches per pulse | n_b | 2625 | # |
| Bunch spacing | t_b | 369 | ns |
| Pulse repetition rate | f_{rep} | 5 | Hz |
| Injection Energy (DR) | E_0 | 5 | GeV |
| Beam Power (x1.5) | P_o | 300 | kW |
| Polarization e-(e+) | P | 80(30) | % |



Electron Source Layout



RDR Electron Source Layout



September 25, 2007

J.C. Sheppard/SLAC

Slide 3



ILC e- Kick Off Meeting



e- source - KOM, Kavli Bldg. 3rd floor conf. room

from **Monday 24 September 2007 (08:00)**
to **Wednesday 26 September 2007 (18:00)**
at **SLAC**
chaired by:
Axel Brachmann (SLAC)

Tuesday 25 September 2007

[top](#)↑

| | | |
|-------|---|---|
| 09:00 | Milestones & Resources in Detail (30) | John Sheppard (SLAC) |
| 09:30 | Polarized RF – Gun - Alternative beyond Baseline (30) | Jorg Kewisch (Brookhaven National laboratory) |
| 10:00 | Work Packages & Organisational Structure (1h00) | John Sheppard (SLAC) |
| 11:00 | break | |
| 11:15 | e- source NC RF structures (30) | Juwen Wang (SLAC) |
| 11:45 | e- Source Laser System (30) | Axel Brachmann (SLAC) |
| 12:15 | Photocathodes for polarized Beams (30) | Takashi Maruyama (SLAC) |
| 12:45 | Lunch | |
| 13:45 | Polarized DC Gun (30) | M. Poelker |
| 14:15 | Source Issues and SLAC's ITF (30) | James Clendenin (SLAC) |
| 14:45 | Discussion and Wrap-Up (1h00) | John Sheppard (SLAC) |

Note: This meeting room is reserved through September 26, 2007



ILC e- Kick Off Meeting



Polarized Electron System Technical Milestones (GDE DESY-H)

- 1. demonstrate ILC source laser system at least at a 'proof of principle' level
- 2. demonstrate photocathode performance
 - - extraction of bunchtrain using ILC laser system,
 - - polarization ~ 90%,
 - - QE 0.5 - 1 %)
- 3. complete technical design of bunching system (SHB's, L-band TW)
- 4. complete technical design of polarized gun (200 kV design)
- 5. complete system engineering for NC source beam line layout



ILC e- Kick Off Meeting



ILC Electron Source EDR Milestones (September 2007 at SLAC)

- Oct 07: Work Packages, initial set
- Dec 07: EDR Scope definition: design depth and breadth, cost, schedule, staff
- Mar 08: Risk Mitigation Analysis
- June 08: Freeze EDR electron source specific deliverables (installation, construction, safety systems,...)
- Dec 08: Freeze layout, full component and civil specifications
- Jan 09: EDR detailed component inventory
- May 09: First cost review
- Nov 09: Second cost review
- Aug10: Deliver EDR and preconstruction work plan



ILC e- Kick Off Meeting

Planning



Tomorrow: September 25, 2007

More of the same but with ART funding profile and SLAC staffing levels

List of Work Packages (no surprises)

Need help in making sure the bases are covered with minimal duplication. Resources are thin and effort will be work-to-funds rather than funds-for-work



ILC e- Kick Off Meeting

Electron Source ART 08



| DOE FUNDING ONLY, IF E1=FALSE. SET E1=TRUE TO INCLUDE Cornell non-SRF tasks | | FY08 | FY08 | FY08 | FY08 | FY08 | FY08 |
|--|------------------------------|--------------|------------------|----------------|--------------------|--------------|--------------|
| Description | WP Ldr | FTE | Direct Labor K\$ | Direct M&S K\$ | Total Indirect k\$ | Total k\$ | ILC line |
| Electron Source Design and Engineering | Brachman, Sheppard | 1.950 | \$273 | \$0 | \$109 | \$382 | \$235 |
| Electron Source Design | | 1.950 | \$273 | \$0 | \$109 | \$382 | \$235 |
| e- EDR Management / Systems engineering | JS(0.2), AB(0.125), VB(0.25) | 0.625 | \$88 | \$0 | \$35 | \$123 | \$123 |
| Source Laser System - Engineering | AB | 0.125 | \$18 | \$0 | \$7 | \$25 | |
| Injector Design - Sim | JW(0.2), FZ (0.25) | 0.450 | \$63 | \$0 | \$25 | \$88 | \$88 |
| Injector Design - Eng | TS (0.5), FZ (0.125) | 0.625 | \$88 | \$0 | \$35 | \$123 | |
| Photocathode Design - Engineering | TM (0.125) | 0.125 | \$18 | \$0 | \$7 | \$25 | \$25 |
| Electron Source R&D | Brachman | 1.450 | \$203 | \$350 | \$134 | \$687 | \$687 |
| Source Laser System | | 0.450 | \$63 | \$200 | \$55 | \$318 | \$318 |
| Pulse Stretcher/Shaping System | AB | 0.150 | \$21 | \$50 | \$16 | \$87 | \$87 |
| Laser Optics/Diagnostics/Controls | AB | 0.150 | \$21 | \$150 | \$31 | \$202 | \$202 |
| Amplification | AB | 0.150 | \$21 | \$0 | \$8 | \$29 | \$29 |
| Injector R&D | | 0.750 | \$105 | \$0 | \$42 | \$147 | \$147 |
| Injector R&D | FZ (0.5), JC (0.25) | 0.750 | \$105 | \$0 | \$42 | \$147 | \$147 |
| RF structure prototype | JW | 0.000 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Photocathode Design | | 0.250 | \$35 | \$150 | \$37 | \$222 | \$222 |
| Photocathode Materials Design and Study | TM | 0.125 | \$18 | \$50 | \$15 | \$82 | \$82 |
| Cathode Test System upgrade | RK | 0.125 | \$18 | \$80 | \$19 | \$117 | \$117 |
| Surface Science | | 0.000 | \$0 | \$20 | \$3 | \$23 | \$23 |
| Next Generation Cathode Test System | | 0.000 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Gun R&D | | 0.750 | \$78 | \$240 | \$67 | \$385 | \$385 |
| Work Package 2 (HV design) | MP | 0.250 | \$26 | \$90 | \$24 | \$140 | \$140 |
| Work Package 3 (Power supply design) | MP | 0.250 | \$26 | \$80 | \$22 | \$128 | \$128 |
| Work Package 4 (LoadLock design) | MP | 0.250 | \$26 | \$70 | \$21 | \$117 | \$117 |

September 25, 2007

J.C. Sheppard/SLAC

Slide 8



ILC e- Kick Off Meeting

Electron Source ART 08



Electron Source Design and Engineering:

| | | |
|------|----------|------------------|
| SLAC | 1.95 fte | 0k\$ M&S, direct |
|------|----------|------------------|

Electron Source R&D

| | | |
|------|----------|--------------------|
| SLAC | 1.45 fte | 350k\$ M&S, direct |
|------|----------|--------------------|

| | | |
|------|----------|--------------------|
| JLAB | 0.75 fte | 240k\$ M&S, direct |
|------|----------|--------------------|

| | | |
|------------------|----------|--------------------|
| Grand Total FY09 | 4.15 fte | 590k\$ M&S, direct |
|------------------|----------|--------------------|

FY09 Request is ~100% increase in effort over FY08 Request



ILC e- Kick Off Meeting



Electron Source 08 Additional Activities

BNL Polarized rf Gun Development at BNL

HV DC Gun Development at Nagoya, KEK, Hiroshima

Do not know level of resources applied to these activities
at this time (will hear from Kewische in a moment)



ILC e- Kick Off Meeting

Electron Source Work Packages



<https://wiki.lepp.cornell.edu/ilc/pub/Public/DampingRings/WebHome/DR-ExpressionOfInterest.doc>

We like A. Wolski's forms and plan to copy his format

ILC Engineering Design Phase

Expression of Interest in Contributing to Damping Rings Work Package(s)

Please read the notes on the following page before completing this form. Thank you.

1. Your details:

| | |
|--|--|
| Name | |
| email address | |
| Affiliation | |
| Name/email of Local ILC/damping rings coordinator | |

2. Which work packages are you interested in contributing to?

Please type an "X" (in the column headed "X") in the table below against all that apply.

If possible, please also indicate the resources you expect to have available over the period of the engineering design phase, i.e. from now through 2010:

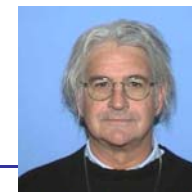
- Please give the **FTE per year**. For example, if you expect to have two people working full time each year through 2010, enter "2" in the FTE column.
- Please give the **total** equipment budget. For example, if you expect to have \$100k in FY08, \$50k in FY09 and \$50k in FY10, enter "\$200k" in the Equipment column.

If possible, please also list potential or agreed collaborators, either institutions or individuals (but do not include their resources in your figures).



ILC e- Kick Off Meeting

Electron Source Work Packages



<https://wiki.lepp.cornell.edu/ilc/pub/Public/DampingRings/WebHome/DR-ExpressionOfInterest.doc>

(You do not include their resources in your figures).

| | X | FTE per year | Equipment total | Collaborators |
|--|---|-----------------|--------------------|---------------|
| Beam dynamics work packages: | | | | |
| Lattice design | | | | |
| Impedance and impedance-driven instabilities | | | | |
| Electron cloud | | | | |
| Ion effects | | | | |
| Other collective effects | | | | |
| Acceptance | | | | |
| Orbit, optics and coupling correction | | | | |
| Technical subsystem work packages: | | | | |
| Vacuum system | | | | |
| Magnets and supports | | | | |
| Wiggler | | | | |
| Power systems | | | | |
| 650 MHz RF system | | | | |
| Injection and extraction systems | | | | |
| Fast feedback systems | | | | |
| Abort systems hardware | | | | |
| Instrumentation and diagnostics | | | | |
| Systems integration and availability | | | | |
| "Global systems" work packages: | | | | |
| Conventional facilities | | | | |
| Control systems | | | | |
| Cryogenics systems | | | | |
| Survey and alignment | | | | |
| Installation and commissioning plans | | | | |

3. Please return this form to Andy Wolski (a.wolski@dl.ac.uk) by 31 August 2007.

Many thanks for your time!

September

lide 12



ILC e- Kick Off Meeting

Electron Source Work Packages



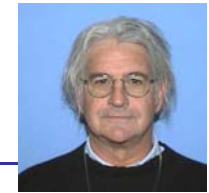
| | | |
|-----------------------------|------------------|-------------------------------------|
| Installation | Asiri | SLAC |
| Magnets | Tompkins | FNAL |
| Power Supplies | Larsen/Bellomo | SLAC |
| HLRF | Larsen (?) | FNAL |
| LLRF/Controls | Cardawine | FNAL |
| Instrumentation | Manfred Wendt | FNAL |
| Vacuum System | Noonan | FNAL |
| Cryogenics | Peterson | FNAL |
| Dumps/Coll. | Markiewicz | SLAC |
| Cryomodules | Adolphson | SLAC |
| | | |
| Acell. Physics | Zhou | SLAC |
| NC RF Structures | J. Wang | |
| Laser prototype | Brachmann | SLAC |
| Gun prototype | Poelker (Kuriki) | JLAB / KEK, University of Hiroshima |
| Photocathode R&D | Maruyama/Prepost | SLAC / University of Wisconsin |
| | | |
| Advanced R&D (not baseline) | | |
| pol. RF gun B. Zvi | | BNL |

Foregoing namelist reflects RDR TS contacts, needs update

Also need to include SLAC EDR coordination and SysEngr

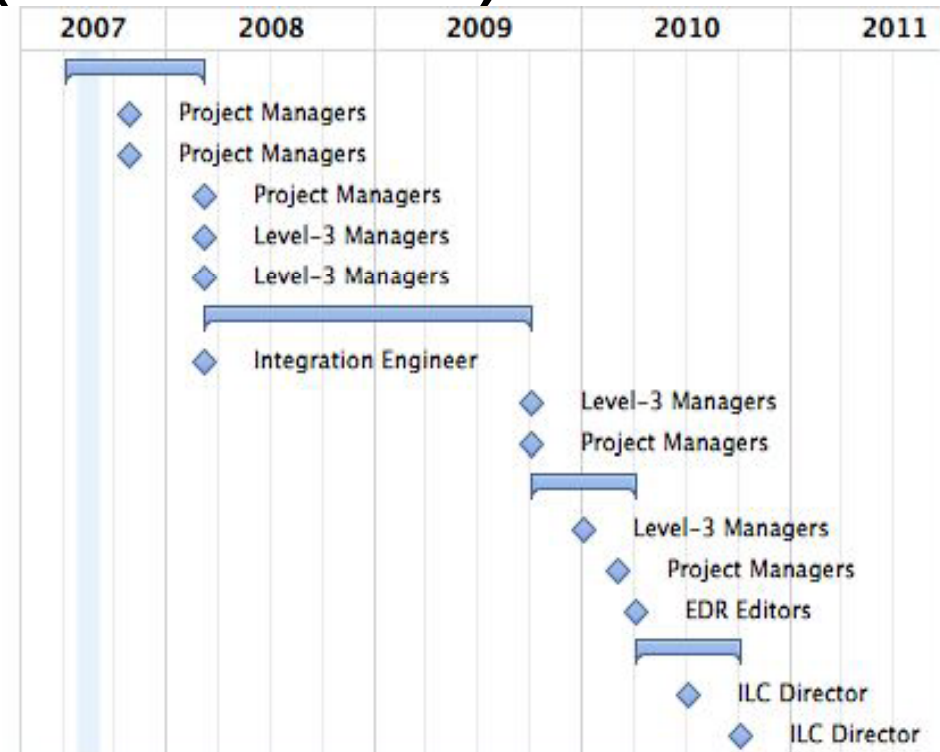


Top-Level EDR Project Schedule (from mcr)



Task

- **1) Planning Phase**
 - 1.1) Release project guidance, tools, organizational info
 - 1.2) Release Engineering Project Management Plan
 - 1.3) Change Control template released
 - 1.4) Release accelerator areas WBS dictionaries
 - 1.5) Release preliminary list of accelerator area work packages
- **2) Execution Phase**
 - 2.1) WBS Level 1-3 Responsibilities & Interfaces reconciled
 - 2.2) Key technical issues answered for Engineering Design
 - 2.3) Completion of integrated value engineering exercise
- **3) Report Preparation Phase**
 - 3.1) First draft of EDR content provided by Level-3 managers
 - 3.2) Complete internal review of draft EDR
 - 3.3) Draft EDR released for external review
- **4) Review & Approval Phase**
 - 4.1) International Independent EDR Review
 - 4.2) Final EDR released



- Need to understand exactly what Planning Phase and Execution Phase mean for e-system.
 - i.e. filling in the details and e- specific milestones