NLC - The Next Linear Collider Project

Special Projects    FY01-FY04

M. Ross
July 27, 2000
Responsibilities:

- Planning, designing, and testing of special systems that are unique, innovative, or span multiple subsystems within the collider.

- Planning, designing, and testing of collider-wide subsystems that require substantial system integration.

- Coordinating, operation, and commissioning of collider prototype accelerator test facilities, such as ATF, ASSET, and NLCTA.

- Testing and analyzing mechanical and electrical subsystems which involve unusually tight tolerances.
Goals for pre-conceptual design work:

- “unique, innovative”
  - Collimation
  - RF / timing system
  - Beam size instrumentation
  - Vibration control/mitigation

- “substantial system integration”
  - MPS, PPS

- “operation, collider prototypes”
  - ATF, ASSET, NLCTA

- “unusually tight tolerances”
  - Magnetic measurements; PM material performance

- New ideas
### Staff

<table>
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<th>&lt;name&gt;</th>
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<tr>
<td>Marc Ross -</td>
<td>Group Leader</td>
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<td>Joe Frisch -</td>
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<td>Keith Jobe -</td>
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<td>Tonee Smith -</td>
<td>RD/ATF, NLCTA and ASSET</td>
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<td>Doug McCormick -</td>
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<td>William Baumgartner -</td>
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- ATF commissioning is supported by 1 FTE from SLAC Accelerator/Accelerator Research Departments
- ATF commissioning is supported by 0.2 FTE from NLC Injector Grp
- Total FTE = 6.5 (FY00)
Projects - NLCTA

• **Operations and RD**
  – Goal 1): Support 24/7 operation of NLCTA for structure testing/processing
  – Goal 2): Build and operate test instrumentation/analyse data
  – Biggest single project for the group
  – NLCTA subsystems in poor shape for 1)
  – Need: Control system (software) and Power system work
    • Budgeted 100K MS/SS for 00; should be increased 3x
    • CD/PCD staff needed (3-4 FTE) → who pays?

• Ongoing effort added to ML development

• Request: Average 3.5 FTE/year **SP** + 300K$/year
Projects – KEK ATF

• RD Goals
  – 1): Commission and prove design of ATF DR/Linac
  – 2): Design and test prototype instrumentation for NLC Inj.
  – Unique features of ATF – the only ‘transverse’ LC prototype
  – Problems achieving 1)

• ATF has provided critical insight for NLC problems
  – Optics (dispersion as a tool to trace coupling sources)
  – Beam Position Monitors (elliptical resolution function)
  – Damping Ring physics; intensity dependence, coupling, instruments

• ATF needs increased effort from SLAC and KEK + ?
• What can the NLC group do?
• Instrumentation/Controls projects
  – Technology development and infrastructure support
  – Beam Position Monitors – multi-bunch ring and extracted
  – Beam size monitors - OTR
• Beam physics
  – Coupling and dispersion correction
  – Stabilization / optimization studies
  – Intra-beam; collective effects
• FY00 Budget ~1FTE+125K MS (65/35 Hardware/Travel)
• Request: Average 2 FTE+200K MS
• Need commitment from KEK ~ few M$ upgrade/year
RD (Frisch)

• Collimation (budget with Beam Delivery?)
  – Liquid Metal 105 (MS/SS K$ through FY03)
  – Rotating Wheel 90
  – Combined – beam tests 100
  – Beam tests FY03

• Vibration (also Beam Delivery?)
  – Inertial sensors, feedback and actuation 400
  – Stabilize realistic Q tubes

• Low level RF/timing system 250
  – Install in LCLS test system

• Structure inspection and monitoring
RD – MPS/PM/Instrumentation

- Coupon tests – FFTB (for various purposes)
  - Copper
  - Tungsten
  - Collimator
- Radiation damage thresholds for SrFeO
- Magnetic measurements
- Laserwire
# Cost Summary

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Marc Ross  
July 27, 2000