

Estimated R+D budgets for FY2001 - FY2003

Josef Frisch draft 2 7/26/00

Note: Manpower totals may exceed 100% on the assumption that not all projects will be pursued.

Liquid Metal Collimator (Beam Delivery Group)

Current Status: Basic materials R+D mostly complete. Detailed design of prototype #1 underway.

Expected status end FY00: Design of prototype #1 Done. Most prototype #1 parts delivered.

FY01 Goals: Construct and test prototype #1 dual roller renewable collimator. Evaluate potential of renewable technology.

FY01 Personnel: Josef Frisch 10%, Knut Skarpaas 25%

FY01 Budget:

Miscellaneous test samples and equipment: \$5000

Prototype #1 materials: \$10,000

Prototype #1 shop: \$20,000

Total \$35,000

FY02: (Merged with Rotating Wheel Collimator).

Rotating Wheel Collimator (Beam Delivery Group)

Current Status: Prototype detailed design underway. Tests of damage detection system underway.

Expected status end FY00: Prototype detailed design complete. Some prototype parts ordered.

FY01 Goals: Complete construction of prototype. Demonstrate mechanical stability. Demonstrate damage detection system. Modify prototype to correct any observed performance problems

FY01 Personnel: Josef Frisch 5%, Eric Doyle 50%.

FY01 Budget:

Prototype parts: \$20,000 (originally budgeted in FY00)

Prototype shop: \$20,000 (originally budgeted in FY00)

Damage detection test parts \$5000

Damage detection test shop:\$5000

Stability measurement parts \$5000

Prototype update parts: \$5,000

Prototype update shop: \$10,000

Total \$70,000

FY01: Merged with consumable collimator

Collimator R+D - Combined FY02 - FY03 (Beam Delivery)

FY02 Goals: Select consumable or renewable collimator as baseline technology. Construct second generation prototype, suitable for use on beam line.

FY02 Personnel: Josef Frisch 5%, Eric Doyle 50%, Knut Skarpaas 10%

FY02 Expenses:

Parts \$60,000

Shop \$30,000

Total \$90,000

FY03 Goals: Beam test of collimator

FY03 Personnel: Josef Frisch 5%, Eric Doyle 50%

FY03 Expenses:

Parts \$50,000

Shop \$50,000

Total \$100,000

Inertial Vibration Stabilization System FY01 - FY03 (Beam Delivery Group)

Current Status: General design concept. Some parts ordered.

Expected status end FY00: Conceptual design done. Data Acquisition parts ordered.

FY01Goals: Perform simulations for simple test mass. Purchase parts for test mass. Write feedback software. Close feedback loop.

FY01 Personnel: Josef Frisch 30%, Knut Skarpaas 50%, Software 50% (*Note software estimate different from Controls group estimate*)

FY01 Budget:

Test mass parts - sensors: \$12,000

Test mass parts - actuators: \$6000

Test mass parts - supports: \$5000

Test mass parts - electronics: \$3000

Test mass parts - Interferometer: \$25,000

Test mass parts - Data Acquisition system: \$20,000

Test mass parts - Software (commercial): \$5000

Test mass parts - shop \$10,000

Total \$86,000

FY02 Goals: Stabilize a pair of test masses, with an interferometer to simulate beam motion.

FY02 Personnel: Josef Frisch 30%, Knut Skarpaas 30%, Software \$25%, Mechanical Engineer 50%

Parts: \$50,000

Shop \$50,000

Total \$100,000

FY03 Goals: Stabilize a pair of realistic quad support tubes

FY03 Personnel: Josef Frisch 25%, Knut Skarpaas 25%, Software 25%, Mechanical Engineer 50%.

Parts \$100,000

Shop \$50,000

Total \$150,000

Capacitive Accelerometer for Vibration Stabilization System (Beam Delivery Group)

Current Status: Electronics design concept demonstrated. Work suspended, this project is not required for continued development of the vibration stabilization system.

Expected status end FY00: No change.

Work, FY01: No work expected.

Goals FY02: Develop prototype electrostatic sensor

FY02 Personnel: Josef Frisch 5%, Mechanical Engineer 25%, Electronic engineer 10%

FY02 Budget:

Parts \$10,000

Test equipment: \$5000

Shop: \$5000

Total \$20,000

Goals FY03: Construct sensors for use on stabilization project.

FY03 Personnel: Josef Frisch 5%, Mechanical Engineer 25%, Electronic Engineer 10%

FY03 Budget:

Parts \$25,000

Shop \$10,000

Total \$35,000

Phase and Timing Distribution System FY01 - FY03 (Controls Group)

(Note manpower different from controls group estimate)

Current Status: The prototype system has demonstrate the required stability, and nearly meets the noise specification. This system has been unreliable.

Expected Status end FY00: Fix reliability and noise problems.

FY01 Goals: Construct a more “realistic” prototype #2 timing distribution system. System to include single analog / optical board, digital control board, receiver board with countdown timer unit. Test feed forward tunnel distribution system (work expected to be completed in FY02).

FY01 Personnel: Josef Frisch 25%, David Brown 50%, Eugene Cisneros 25%, Electronic Engineer 50%.

FY01 Budget:

Optical Components: \$5000
Electronic Components: \$10,000
Electronic shops: \$5000
PC board \$5000
Test Electronics \$25,000
Test ovens, etc.: \$10,000
Tunnel distribution test parts: \$10,000
Tunnel distribution test shop: \$5000

Total \$75,000

FY02 Goals: Finish / modify “realistic” prototype of full system. Convert PLD to ASIC. Long term performance measurement.

FY02 Personnel: Josef Frisch 10%, David Brown 50%, Eugene Cisneros 25%, Electronic engineer 50%

FY02 Budget:

Components (includes 2 fab runs): \$50,000
Shop \$25,000

Total \$75,000

FY03 Goals: System installed on accelerator for testing (possibly LCLS).

FY03 Personnel: Eugene Cisneros 25%, Electronic engineer 100%

FY03 Budget:

Components: \$50,000

Shop \$50,000

Total \$100,000

Wavelength Tunable Laser for Phase Transmission System (CEP)

Current Status: Minimal progress due to repeated failures of the acousto-optical tuner. Initial results were not promising. System is no longer required for the phase transmission system.

Expected status end FY00: Decision on whether to proceed with project. Expect project to be canceled, parts recycled to other projects.

NLCTA Structure Inspection System (NLCTA)

Current status: The first prototype image head is being tested.

Expected status end FY00: Operating remote fiber read head.

FY01 Goals: Finish read head construction / testing. Design and instal remote control and video data acquisition. Project to be completed in FY01.

FY01 Personnel: Josef Frisch 10%, Mechanical Engineer: 20%, Software Engineer 20%

FY01 Budget:

Optical / electronic test equipment: \$5000

Optical / mechanical components: \$5000

Remote control states \$5000

Data acquisition system \$10,000

Total \$25,000

NLCTA Acoustic breakdown measurement (NLCTA)

Current Status: Acoustic signals have been observed correlated to structure breakdown.

Expected status end FY00: Initial tests to “echo locate” breakdowns.

FY01 Goals: Demonstration of Echo Location. Incorporation of acoustic signals into processing system.

FY01 Personnel: Josef Frisch 10%, Doug McCormick 10%, Software engineer 10%

FY01 Budget:

Accelerometers, electronics, etc.: \$5000

Test Equipment: \$5000

Total \$10,000

Laser Wire R+D (Special Projects)

Current status: Design concept, not currently funded

FY01 Goals: Begin collaboration with Thorsten Kamps, Graham Blaire at London University. They will construct a low power IP.

FY01 Personnel: Josef Frisch 5%

FY01 Budget:

Travel \$5000

Total \$5000

FY02 Goals: Construct a high power (Q-switched YAG) IP at London University

FY02 Personnel: Josef Frisch 10%

FY02 Budget:

Travel \$5000

Total \$5000

FY03 Goals: Install laser wire on test beamline (ATF? ASSET? FFTB?)

FY03 Personnel: Josef Frisch 10%, Mechanical Engineer 10%, Electronic engineer 10%, Doug McCormick 10%.

FY03 Budget:

Parts for installation (does not include laser wire system) \$10,000

Shop \$20,000

Total \$30,000

Source Laser R+D (Sources)

Current Status: Basic system concept is complex and expensive. R+D required to demonstrate system performance, reduce cost, improve reliability. No work funded.

Requirements: The laser development is approximately 2 FTEs for 5 years + \$3.5M (depending on cost breakdowns). Work not funded.

MPS R+D - Coupon Tests (Special Projects)

Budget carried elsewhere.

MPS R+D System Design, Reliability Design (Special Projects).

Current Status: Conceptual designs for the MPS system exist, but no detailed designs.

Expected status end FY00: No additional work

Goals FY01: Continue work on conceptual design

FY01 Personnel: Josef Frisch 5%. Keith Jobe 5%

Goals FY02: Test critical hardware - not yet specified

FY02 Personnel: Josef Frisch 5% Electronics Engineer 10%, Mechanical Engineer 10%

FY02 Budget: (estimate)

Parts \$10,000

Shop \$10,000

Total \$20,000

Goals FY03: Demonstrate critical hardware - not yet specified

FY03 Personnel: Josef Frisch 5% Electronics Engineer 25%, Mechanical Engineer 25%

FY03 Budget: (estimate)

Parts \$25,000

Shop \$25,000

Total \$50,000

Crab Cavity (Beam Delivery)

Current Status: Conceptual design done

Expected status end FY00: No change

Work FY01: None planned

Goals FY02: Demonstrate required stability in low power system

FY02 Personnel: Josef Frisch 5%, RF engineer 25%, Mechanical Engineer 10%

FY02 Budget:

RF parts: \$25,000

RF Test equipment \$10,000

Mechanical parts \$10,000

Shop \$10,000

Total \$55,000

FY03 Goals: High power demonstration Note that high power testing may be prohibitively expensive.

FY03 Personnel: Josef Frisch 5%, RF engineer 25%, Mechanical Engineer 10%. Klystron / high power RF engineer 50%.

FY02 Budget: (assumes borrowing of 2 S-band tubes and modulators).

High power test source components (mostly borrowed): \$25,000

Shop \$50,000

Additional components \$25,000

Total \$100,000

IP Intratrain Feedback (Beam Delivery)

(in collaboration with several other labs)

Current Status: Multiple labs are interested in this concept. Conceptual work ongoing. Some plans for international collaboration on tests has been done.

Expected status end FY00: No change.

FY01 Goals: Demonstrate high power, low time delay amplifier

FY01 Personnel: Mike Browne 25%, Electronics engineer 50%.

FY01 Budget:

Amplifier parts \$30,000

Shop \$15,000

Test equipment \$15,000

Total \$60,000

FY02 - FY03: Plans will depend on international collaboration results. Expect funding and manpower to be required to continue at the FY01 level.

ATF transition radiation spot size monitor (Special Projects)

Current status: Design concept. There is a disagreement on the theory of transition radiation and limiting resolution.

Expected status end FY00: Evaluate transition radiation limiting resolution

FY01 Goals: Construct spot size monitor for use on ATF

FY01 Personnel: Josef Frisch 5%, Doug McCormick 10%

FY01 Budget:

Vacuum chamber parts \$5000

Vacuum chamber shop \$3000

Optical parts \$5000

Test samples (includes GaAs screen) \$10,000

Electronic parts \$3000

Electronic shop \$2000

Total \$28,000

ATF Bunch phase measurement system (Special Projects)

Current Status: System tested at ATF. Measurement indicated no anomalous impedance. Project on hold.

ATF 2 ω s Measurement (Special Projects)

Current Status: System development on hold

Resources to complete project:

Manpower: 2 man months.

Budget: \$5000

ATF tune monitor: (Special Projects)

Current Status: System development on hold

Damping Ring Simulator (Special Projects)

Current Status: Project Complete