

Work to Complete RDR

J. Scott Berg
Physics Department
Brookhaven National Laboratory

MAP Technical Board
March 2, 2011

- Outline
 - Design/simulation requirements
 - Engineering requirements
 - EU contributions
 - US contributions
 - Totals & summary
- Color code
 - MAP has full responsibility for this
 - MAP has partial responsibility for this
 - MAP not committed to this
- My guess!

Design Tasks for Entire System



- Maintaining the lattice definition (0.4)
- Tracking distribution through full machine (1.5)
- Writing the RDR (3.0)

Subsystem-Specific Design Tasks for RDR



- Proton driver (2.0)
 - Demonstrate that Project-X meets IDS-NF requirements (2.0)
- Target (1.5)
 - Re-design of solenoid capture system and shielding (0.5)
 - Define full infrastructure for a target station (1.0)
 - ◇ Outer shielding and containment
 - ◇ Mercury loop
 - ◇ Beam dump
 - ◇ Remote handling

Subsystem-Specific Design Tasks for RDR



- Front end (0.8)
 - Mechanism for handling particle losses (0.8)
- Linac/RLA (1.4)
 - Fill in missing pieces (0.3)
 - Physical layout (0.4)
 - Tracking (0.7)

Subsystem-Specific Design Tasks for RDR



- FFAG (1.6)
 - Longitudinal dynamics (0.6)
 - ◇ Compute optimal matched beam
 - ◇ Design longitudinal matching to other systems
 - 6-D tracking through entire system (0.4)
 - Compute error tolerances (0.1)
 - Decide on amount of chromaticity correction (0.5)

Subsystem-Specific Design Tasks for RDR



- Decay ring (1.6)
 - Design injection system (0.3)
 - Decide on inclusion of sextupoles (0.1)
 - Complete design of non-standard diagnostics (0.7)
 - ◇ Polarimeter
 - ◇ System for measuring/computing spectrum to far detector
 - Particle loss analysis (0.5)

- Translate lattices to “generic” component list for costing (1.3)
 - Proton driver (0.3)
 - Front end (0.3)
 - Linac/RLAs (0.3)
 - FFAG (0.2)
 - Decay ring (0.2)

- Design of difficult components for feasibility and costing (2.6)
 - Target (2.0)
 - FFAG
 - ◇ Injection and extraction hardware (0.3)
 - ◇ Combined-function magnets?
 - Decay ring
 - ◇ Injection hardware (0.1)
 - ◇ Diagnostics (0.2)
- Maintenance of costing and engineering (1.2)

- Overall design: 4.9
- Subsystem design: 8.9
 - Proton driver (2.0)
 - Target (1.5)
 - Front end (0.8)
 - Linac/RLA (1.4)
 - FFAG (1.6)
 - Decay ring (1.6)

- Engineering and costing: 4.5
 - Generic components (1.3)
 - Difficult components (2.6)
 - Costing maintenance (1.2)
- Grand total: 18.9

European Manpower toward RDR, per Year



- Aslanejad: 0.2 (Front End)
- Back: 0.4 (Target)
- Bliss: 0.2 (Engineering/Costing)
- Canfer: 0.1 (Target)
- Davenne: 0.1 (Target)
- Densham: 0.1 (Target)
- I. Efthymiopoulos: 0.1 (Costing, Target)
- Jenner: 0.5 (Proton Driver)
- Kelliher: 0.5 (FFAG)
- Kurup: 1.0 (Linac/RLA, costing)

European Manpower toward RDR, per Year



- Long: 0.5
- Machida: 0.1 (FFAG)
- Pasternak: 0.4 (Proton Driver, Front End, FFAG)
- Pozimski: 0.5 (Linac/RLA, Overall)
- G. Prior: 0.5 (Target, Front End)
- Rogers: 0.7 (Front End)
- Thomason: 0.1 (Proton Driver)

US Effort toward RDR per Year



- Beard: 0.8 (Linac/RLA)
- Bogacz: 0.1 (Linac/RLA)
- Berg: 0.5 (FFAG/Overall)
- Gollwitzer: 0.2? (Proton Driver)
- Jenner: 0.5 (Proton Driver)
- Kirk: 0.5 (Target)
- McDonald: 0.3 (Target)
- Neuffer: 0.1 (Front End)
- Souchlas: 1.0 (Target)
- Weggel: 0.2 (Target)

US Effort toward RDR per Year



- Zisman: 0.3 (Overall)

- US+EU (Design+Engineering+Detail Engineering)
- Total: 5.5+4.5 (per year), 11.0+9.0=20.0 total
 - Proton Driver: 1.5+1.2 (2.0+0.3)
 - Target: 2.0+3.8 (1.5+2.0)
 - Front end: 2.3+0.2 (0.8+0.3)
 - Linac/RLA: 1.4+1.6 (1.0+0.3)
 - FFAG: 1.5+0.5 (1.6+0.2+0.3)
 - Decay ring: 0+0 (1.6+0.2+0.3)
 - Costing/engineering management: 1.5+0 (1.2)
 - Overall: 1.8+1.7 (4.9)

- Effort totals look OK
- Effort mismatches
 - Efforts given are mostly design, not engineering
 - Matching of EU effort on target
 - EU efforts high on front end
 - Nobody committed to decay ring