

US LHC Accelerator Research Program  
Task Sheet FY07

**Task Name:** Low Energy Ring Injector Accelerator for LHC (x.x.x.x)

**Date:** May 31, 2006

**Responsible Person:** Henryk Piekarz

**Statement of work:**

The goals for Fiscal year 2007, which is the first year this task receives LARP funding, are: (i) design the LER lattice including the LER-LHC transfer lines, (ii) evaluate B-field and dynamic aperture requirements, (iii) evaluate the emittance growth and beam losses, (iv) evaluate potential luminosity gains with the implementation of the LER, (v) evaluate colliding detector safety with the operation of the LER-LHC transfer lines, (vi) produce preliminary designs of required new major accelerator systems: (1) fast pulsing magnet with its supporting cryogenics and the power supply consisting of multiple switcher cells, transformer/heater and a superconducting dump resistor, and (2) two-bore high-field magnet (7-8 Tesla) with a horizontal orientation of magnetic field, and (vii) evaluate the LER cost in FY07 \$. We assume that all accelerator system tasks will evolve into a prototype design stage only after the CERN decision to proceed with a Technical Design Report for the LER has been taken.

**Milestones:**

- October 05 A month-long trip to CERN (Henryk Piekarz, invitation from CERN) to discuss a feasibility of the pre-accelerator ring (LER) in the LHC tunnel. The LER is proposed to be based on the VLHC low field magnet developed recently at Fermilab.
- April 06 Gijs de Rijk presented the LER concept at the WAMDO (CARE) workshop at CERN.  
John Johnstone and Henryk Piekarz presented the LER concept at the US LARP meeting at LBL.
- October 06 LER Accelerator Workshop at CERN

**Budget:**

The total budget for FY07 is \$50k, for travel expenses comprising of multiple trips to CERN to discuss issues relevant to the LER accelerator lattice and component design.

**US Collaborators:**

FNAL Giorgio Ambrosio, Steve Hays, Yuenian Huang, John Johnstone, Vladimir Kashikhin, Henryk Piekarz, Tanaji Sen and Vladimir Shiltsev

**CERN Liaison(s):** Lucio Rossi, Gijs de Rijk