

Mechanical Batteries—High Performance Carbon-Composite Flywheels for Energy Storage

13 June 2014 – ME Auditorium 1300

With Guest Lecturers Dick Post & Bob Yamamoto

Lawrence Livermore National Laboratory

Abstract:

The “new breed” of flywheel under development at the Lawrence Livermore National Laboratory (LLNL) embodies several novel design concepts for storing electrical energy as rotational energy. The new designs specifically address the requirements of low capital cost, long service life with minimal maintenance, and low rate of self-discharge, features that are essential for satisfying a growing need for cost-effective energy storage. LLNL is currently focused on two specific applications:

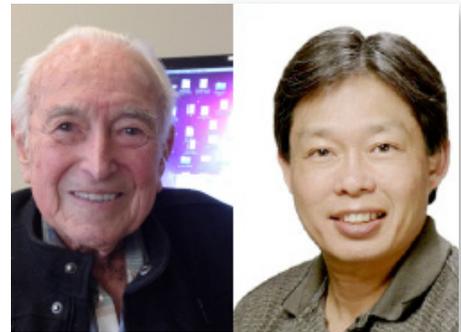
- Bulk storage of electrical energy where the flywheel module may be charged at one time of the day (for solar or wind power systems), storing its energy for use many hours later.
- Use of energy storage for vehicular applications, e.g. those of electric-powered automobiles, both full electrics and hybrids.

The *integration* of our Electromechanical Battery’s (EMB) three key technologies, namely the composite rotor, the passive magnetic bearing system, and the new version of the electrostatic generator/motor, which distinguishes the “new-breed” LLNL EMB from all other commercially available flywheel-based energy storage systems, will be discussed.

Abridged Biographies:

Dick Post is the Principal Scientist for the Electromechanical Battery (EMB) program at Lawrence Livermore National Laboratory (LLNL). Dr. Post’s career spans 75 years, which includes topics such as controlled nuclear fusion, electron accelerator research, magnetic levitated trains, submarine sonar/underwater sound propagation, and energy storage. He was one of the first employees at LLNL, coming to the lab in 1952, the year it was open. Dick has an undergraduate degree in physics from Pomona College, and a PhD in physics from Stanford University.

Bob Yamamoto is the Principal Investigator for the Electromechanical Battery (EMB) program at the Lawrence Livermore National Laboratory (LLNL). Mr. Yamamoto has worked at both National Labs (LLNL and LBNL) and the private sector during his 37-year career. Areas of expertise include solid-state lasers, magnets (resistive and superconducting), cryogenics, vacuum and pressure vessels, which has culminated in the designing and building of experimental hardware in excess of \$100M. He has a BS in Mechanical Engineering from UC Berkeley, a MBA from Golden Gate University and is a registered professional mechanical engineer in the state of California.



Dick Post & Bob Yamamoto



NAVAL
POSTGRADUATE
SCHOOL