EXECUTIVE SUMMARY

PROPOSAL SOLICITATION NUMBER: SBCR-FN-0511-MSIP02

DESCRIPTIVE TITLE: DESIGN OF ACTIVE CONTROL FOR SEISMICALLY EXCITED NUCLEAR PLANTS CONSIDERING TIME-DELAYS AND STOCHASTIC VIBRATION

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ESTIMATED COST: $186,445

PERIOD OF PERFORMANCE: October 1, 2011 ~ September 30, 2013 (2 years)

SUMMARY: A reliable active control method will be developed to mitigate the impacts on nationally critical structures, such as nuclear power plants, exposed to earthquake load. The new method will incorporate two critical factors (time-delays and stochastic excitations), and will be based on analytical solutions newly derived by the PI, unlike existing methods for time-delay systems. Since it does not depend on approximations or predictions, the new method will show improved accuracy and robustness in performances. Also, in parallel with the proposed research activities, educational materials will be developed for underrepresented undergraduate and graduate students to have hands on practice through experimental tests in relevant areas based on research results. The education topics include mathematical modeling of dynamic systems using differential equations, instrumentation, and design of control.