The next generation of NASA launch vehicles and spacecraft will minimize the use of hydraulic power systems due to their inherent inefficiencies. These hydraulic systems will be replaced with all electric power components. NASA is interested in optimizing these electric components to maximize system reliability and efficiency while minimizing overall size and mass. Of particular need are electric actuation systems, including electromechanical (EMA) and electrohydraulicstatic (EHA). These are important in order to realize the full potential of the more electric power systems. The actuator systems will consist of both the actuator and associated controls. These systems will be used for a number of applications including thrust vector control, engine actuation and vehicle surface actuation. The technology would directly benefit programs such as Constellation which have a variety of requirements for the Crew Launch Vehicle, Cargo Launch Vehicle, Lunar Surface Access Module, and others. These systems may range from a few horsepower to greater than 50 horsepower, and the associated electronics may see temperature extremes up to 175°C. To make electric actuation a more viable option, improvements in mass, size, efficiency and power density are sought for both the actuator and associated controls. Current state-of-the-art actuators suitable for engine thrust vector control on a launch vehicle have a power density of 1kW/kg for duplex drives (two motors driving one transmission, not including inverters and controllers). Innovations are sought to increase this power density to at least twice the SOA. In addition, state-of-the-art controllers can be 20 - 50% of the actuator size and weight alone, therefore novel approaches to minimizing controller mass and volume are sought. Innovative approaches to redundant electric actuator systems and redundancy systems management will also be considered which would help reach the single fault tolerant vehicle requirements. Technologies of specific interest include:

- Lightweight, high power density electric actuators and controls in the 5 - 10 hp range for use on vehicles such as Crew Launch Vehicle and Earth Departure Stage, with an actuator density goal of 2kW/kg and controller density of at least 1.5 kW/kg;

- Lightweight, high power density electric actuators and controls suitable for 30 - 60 hp applications on vehicles such as Cargo Launch, with an actuator density goal of 2kW/kg and controller density of at least 1.5 kW/kg;

- Actuation and control technologies capable of operating over wide temperature ranges - up to a chassis temperature of 175°C;

- Novel redundant EA systems and redundancy management approaches for single fault-tolerant vehicle applications.