

lem is proportionately improved. Consider a certain motor size and gear train selection where the back-emf constant has been selected to meet a required output speed. The corresponding K_t and L , however, produce an uncontrollable current regulator. If the wire size is decreased by three gauges, for example, and the slots are filled with twice as many turns (the slots will be full in this exam-

ple), then the R and L will increase by a factor of four, while the K_t and K_b will increase by a factor of two. If the slots are only filled 67 percent in the correct fashion and the other 33 percent of the windings are placed in incorrect slots, then the K_t and K_b are reduced to their original levels.

The fourfold benefit of the inductance increase assists the current con-

trol. The resistance increase will cause more heating since the current level is unchanged in this example. If this is a problem, the motor thermal mass can be increased as a solution.

This work was done by Steve Abel of Honeywell Aerospace for Johnson Space Center. For further information, contact the JSC Innovation Partnerships Office at (281) 483-3809. MSC-24906-1

International Space Station-Based Electromagnetic Launcher for Space Science Payloads

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A method was developed of lowering the cost of planetary exploration missions by using an electromagnetic propulsion/launcher, rather than a chemical-fueled rocket for propulsion. An electromagnetic launcher (EML) based at the International Space Station (ISS) would be used to launch small science payloads to the Moon and near Earth asteroids (NEAs) for the science

and exploration missions. An ISS-based electromagnetic launcher could also inject science payloads into orbits around the Earth and perhaps to Mars.

The EML would replace rocket technology for certain missions. The EML is a high-energy system that uses electricity rather than propellant to accelerate payloads to high velocities. The most common type of EML is the rail gun. Other

types are possible, e.g., a coil gun, also known as a Gauss gun or mass driver. The EML could also “drop” science payloads into the Earth’s upper atmosphere for science investigations.

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