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SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

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MAGNETO-PLASMA ROCKET PROPULSION

Abstract

The final space shuttle mission took place in July 21st 2011 after which NASA decided to not to have any more space shuttle mission as they are expensive, risky and non reliable any more. Liquid propulsion system used in space shuttle mission were of huge mass, costly and risky. Presently man are thinking about doing inter planetary space travelling mission especially to Mars. To leave low earth orbit to another planet the space vehicle would require higher velocity which will require higher amount of fuel. To carry huge mass of fuel along with the space vehicle would not be efficient as well as to achieve such an high velocity to leave lower earth orbit to other planets would not accomplished by using liquid propulsion. It will also take long period of time to reach another planet using present liquid propulsion system. In the midst of the economic crisis, the world is facing a big challenge in the field of aerospace which is bringing out better technologies which are cheaper and efficient than the present technologies. Electric propulsion comes as a solution to these problems. But there isn't any efficient and reliable electric propulsion system until the Magneto plasma Rocket Propulsion system is introduced.

Magneto plasma Rocket Propulsion (MRP) system is an electromagnetic thruster for spacecraft propulsion. MRP uses radio waves to ionize and heat the Argon propellant which is a cheap propellant. This stream of plasma formed from Argon is accelerated using high magnetic fields which generates thrust. MRP is capable of functioning at high thrust-low specific impulse mode or low thrust-high specific impulse mode. The MRP system is capable of producing a thrust of 5.7 N resulting in 50 km/s with an thrust efficiency of 0.72. The MRP system has a specific impulse of 5000 seconds. It would take a huge amount of liquid fuel to produce 50 km/s thrust velocity.

MRP is not suitable to launch payloads from surface to earth due its low thrust to weight ratio. MRP would function as an upper stage for cargo, reducing the fuel requirements for in space transportation. The engine is expected to perform to perform drag compensation for space stations, lunar cargo delivery, satellite re-positioning, satellite refueling, maintenance and repair, space resource recovery, ultra fast deep space robotic missions. MRP could be a breakthrough that would reduce the duration of mars mission from 2.5 years to 5 months.