

SPACE PROPULSION SYMPOSIUM (C4)  
Hypersonic and Combined Cycle Propulsion (5)

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## SCRAMJET

**Abstract**

As we come to the age of high speed vehicles and spacecrafts propulsion has become a very important topic for research. The process of causing a body to move by exerting a force against it is known as PROPULSION. Propulsion is based on the Newton's reaction principle. A lot of techniques of propulsion other than the normal petrochemical and liquid hydrogen are being used and studied upon. Some of those on which research is going on are electrothermal, laser, ion, jet, plasma, tether-based propulsion, biofuels, cryogenics, etc.

SCRAMJET basically is a ramjet engine in which all the processes specially the combustion of gases is done at supersonic speeds. The fastest scramjet flight flied at 9.8 times the speed of sound and theoretically can move up to 12 times the speed of sound

It's a supersonic ramjet engine which is a variant of ramjet air breathing engine. It is a very advantageous method for military applications and space propulsion technique and many more applications where speed is very important. It allows us to achieve very high speeds in very short interval of time and will help us reach miles in minutes. Hence a very useful technology even for civil aviation sector as it will enable us to cheap and fast transport.

Thus being the tomorrows technology, research on scramjet is not only a topic for bring in new propulsion technique but a necessary research topic for development of the aerospace department of the globe since being conceptually simple, actual implementation is limited by extreme technical challenges. Hypersonic flight within the atmosphere generates immense drag, and temperatures found on the aircraft and within the engine can be nearly six-times greater than that of the surrounding air. Maintaining combustion in the supersonic flow presents additional challenges, as the fuel must be injected, mixed, ignited, and burned within milliseconds. While scramjet technology has been under development since the 1950s, only very recently have scramjets successfully achieved powered flight.

So if learnt upon this technique we will be able to propel the spacecrafts and rockets to a much better speed and distance so as to we can at least see a small portion of this large universe!!!