

IAF SPACE PROPULSION SYMPOSIUM (C4)  
Electric Propulsion (1) (5)

Author: Prof. Michael Keidar  
George Washington University, United States, keidar@gwu.edu

## PERSPECTIVES IN AIR-BREATHING PLASMA PROPULSION

**Abstract**

Multiple configurations of air-breathing thrusters are currently considered. This talk will outline state of the art and will present some new development such as scramjet configuration that can significantly reduce the drag by avoiding compression. In this case high ionization is required. Preliminary analysis suggested relatively high power requirement [1]. This talk will focus the ionization in the scramjet-type air-breathing plasma thruster in low earth orbit applications. To this end, plasma chemistry simulation for air in the low earth orbits (80-110 km), to explore the possibility for high ionization of incoming air. The plasma chemistry simulation was performed for air and the variation of ionization degree and species densities were observed concerning the mean input energy that contributes to the chemical reactions. In addition, concept of air—breathing plasma thruster without neutralizer will be discussed.

[1] L. Pekker and M. Keidar, Analysis of Air Breathing Hall-Effect Thrusters, Journal of Propulsion and Power, vol. 28, No. 6, pp. 1399-1405, 2012.