



How can we improve accuracy of Earth's bow shock models?

J. Merka (1)

L-3 Communications Government Services, Inc., Vienna, Virginia, USA

In more than three decades, spacecraft have crossed the terrestrial bow shock tens of thousand times providing enough data to construct many bow shock models. However, several studies have demonstrated severe limitations in the predictive capabilities of the most used bow shock models due to inadequate parametrization and/or limited amount of data employed. The accuracy of bow shock models is also hindered by the fact that the models predict an equilibrium bow shock position for given conditions while spacecraft generally observe a moving shock. Furthermore, Merka and Szabo [2004, doi:10.1029/2004JA010567] recently pointed out that the dipole tilt angle and the solar wind/IMF angle significantly influence bow shock position but are not accounted for in any of the existing bow shock models. The presentation will discuss the inherent limitations of the current approaches in bow shock modeling and will outline the ingredients/method required to improve predictive capabilities of bow shock models.