LESSONS FROM 'MISSIONS TO MODELS' OF THE MARS IONOSPHERE. J. G. Luhmann[1], Y. Ma[2], M. Matta[3], D. Brain[4], S.M. Curry[1], and D. Ulusen[5], [1]Space Sciences Laboratory, University of California, Berkeley, [2]IGPP, UCLA, Los Angeles, CA, [3]Boston University, Boston, MA, [4]LASP, University of Colorado, Boulder, CO, [5]TUBITAK, Ankara, Turkey.

Introduction: "Missions to Models" have become one of the cornerstones of science planning for the MAVEN mission. While many of these model analyses have focused on the atmosphere escape issue, some also provide useful information on the complex Martian ionosphere that MAVEN will probe. The large archive of radio occultation results, and more recently MARSIS remote sensing observations, suggest the range of variations that exist. However, the state-of-the-art is detailed photochemical models, including production and loss assumptions, do not include the influences of the crustal remanent fields and the solar wind interaction. BATS-R-US MHD models of the Mars solar wind interaction incorporate both the basic ionospheric photochemical processes together with boundary conditions that allow simulation, in 3D, of the global effects of the planetary fields and solar wind erosion. In the first report describing this model, Ma et al. [1] showed that the Viking lander profiles could be reproduced, suggesting promise for MAVEN observation interpretations as well. Since that time, other efforts have been made toward improving different aspects of such models, including sophisticated neutral atmosphere descriptions and specific treatment of different ion species in the plasma interaction. Nevertheless, the original model design still has many advantages and potential applications, including basic ionosphere data comparisons and numerical experimentation. In anticipation of such uses, we examine some attributes of the ionospheres in several 'model data sets' for different crustal field local times, interplanetary field orientations, solar wind plasma parameters, and solar EUV flux. These provide some insights about what we may find in the upcoming observations.

References: [1] Y. Ma et al.,. (2004) *JGR, 109*, doi:10.1029/2003JA010367.