

Abstract Submitted  
for the DPP11 Meeting of  
The American Physical Society

**3D Modeling of Equatorial Plasma Bubbles**<sup>1</sup> JOSEPH HUBA, Naval Research Laboratory, GLENN JOYCE, Icarus Research, Inc., JONATHAN KRALL, Naval Research Laboratory — Post-sunset ionospheric irregularities in the equatorial F region were first observed by Booker and Wells (1938) using ionosondes. This phenomenon has become known as equatorial spread F (ESF). During ESF the equatorial ionosphere becomes unstable because of a Rayleigh-Taylor-like instability: large scale (10s km) electron density “bubbles” can develop and rise to high altitudes (1000 km or greater at times). Understanding and modeling ESF is important because of its impact on space weather: it causes radio wave scintillation that degrades communication and navigation systems. In fact, it is the focus of of the Air Force Communications/Navigation Outage Forecast Satellite (C/NOFS) mission. We will describe 3D simulation results from the NRL ionosphere models SAMI3 and SAMI3/ESF of this phenomenon. In particular, we will examine the causes of the day-to-day ariability of ESF which is an unresolved problem at this time.

Booker, H.G. and H.G. Wells, *Terr. Mag. Atmos. Elec.* 43, 249, 1938.

<sup>1</sup>Research supported by ONR.

Joseph Huba  
Naval Research Laboratory

Date submitted: 15 Jul 2011

Electronic form version 1.4