

## Ionosphere-thermosphere studies using the NICT real-time space environment simulator

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Disturbances in the upper atmosphere could affect various communication and broadcasting systems, GPS positioning systems, and satellite orbits. In order to understand present state of the upper atmosphere and to predict disturbances, it is necessary to develop a real-time numerical model of the space environment. At the National Institute of Information and Communications Technology (NICT), we have been developing the Real-time Space Environment Simulator. In 2003, a real-time global MHD model of the solar wind interaction with the earth's magnetosphere was developed at NICT in collaboration with Kyushu University and the Meteorological College. The model is now operated at the space weather forecast center of NICT. The real-time magnetospheric simulation model is able to give ionospheric parameters such as conductivities and the electric potential in the high-latitude region. In 2007, we developed a real-time ionosphere-thermosphere simulation model using the ionospheric parameters given by the magnetospheric model. A real-time solar wind model was also developed in 2007. We will describe the current status and future prospects of the Real-time Space Environment Simulator with emphasis placed on the ionosphere-thermosphere model. Ionosphere-thermosphere processes reproduced by the model will be discussed and compared with observations.