

A Quasi-realtime Virtual Reality System of 3D Computer Simulations for Space Weather via High-Speed Network

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We have constructed a system, in which real-time 3-D computer simulation data are visualized, transferred, and rendered on a virtual reality system via long-distance and wide-band networks. The computer simulation in the present study is the real-time numerical space weather simulation, which is being conducted on an SX-6 super-computer located at National Institute of Information and Communications Technology. In the present system, the simulation yields numerical data of 7MB every 10 seconds. The numerical data are converted to the 1,500 3-D visualized data files. The data size is 70MB in total. The 3-D visualized data are archived together with 80 step data, then transferred from Japan to U.S.A via 10Gbps international network. To achieve low latency and large size data transfer, the UDT protocol is used in the present system. Finally, a virtual reality system in U.S.A. presents the real-time 3-D simulation data. The minimum delay time from the computer simulation to the VR rendering is 48 seconds, which is practical for the space weather at the distant site from a super-computer.

