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OPERATION MODES OF DEMAND ACCESS SERVICE IN TDRS SYSTEMS

Abstract

Tracking and Data Relay Satellite System (TDRSs) is developed to provide data relay, continuous tracking and orbit control service between spacecraft and spacecraft of low-orbit or between spacecraft and ground station. Different from the traditional services that are scheduled days in advance, Demand Access Service (DAS) system provides nearly real-time and on-demand automatic services. Due to its low-cost and easy-to-implementation nature, the demand of DAS service is largely increasing and becoming complicated. To accommodate such DAS service demands, moving beyond basic demand access forward (DAF) and demand access return (DAR) modes, various operation modes are required to be designed for DAS systems. This paper will first introduce and analyze the control procedures of the several typical service modes (i.e., DAF and DAR) of the DAS system in NASA TDRSSs. Then we design new operation modes for DAS to support more complicated services. Specifically, by carefully designing the cooperation between forward and return services, DAS system can be updated to provide orbit control and data-tracking services. Application-level simulations of control operations validate our design. We believe our study of operation modes will stimulate the development of DAS services in TDRS system.