

SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
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PROSPECT AND ANALYSIS OF TT&C SYSTEM BASED ON CPS

Abstract

To implement the objective of smart TTC (tracking telemetry and command) system, it is essential to introduce the state of the art computing, communication and sensing technologies, and seamlessly integrate them with the TTC system. The cyber physical system (CPS) is an emerging but highly important research area concerning the deep integration of physical and information systems. In this work, based on the concept of the CPS and taking into account the characteristics of the TTC system, the cyber physical TTC system (CPTTCS) is proposed.

CPS is a kind of efficient and intelligent information system base on embedded equipments; it can improve the system's abilities of information management, real-time communication, remote control and independence, by means of integration of computing unit and physical unit. CPS contains 3Cs (Computation, communication, Control) technologies, involving such characteristics: real-time, safe, reliable, high capability.

Smart TTC Network is the trend of TTC system, and the kernel technology is information processing. In XSLC (Xichang Satellite Launching Center), the IP network is constructed and a kind of integrative information system is applied. There are several shortages in existing information system: 1)A majority of information of TTC equipments can't be send out because of un-uniform interfaces, and the usage rate of internet is low; 2)It's difficult to share real-time tracking information between Radars; 3)It's difficult the transfer and process a great deal of data in existing system. To construct CPTTCS is the approach to solve the difficulties of TTC system. Integrating with characteristic of TTC system, CPTTCS can be described by a layered model, which involves physician-layer, internet-layer, cooperation-layer, and application-layer.

In this paper, the architecture and major components of the CPTTCS are then illustrated. Several important research problems associated with the CPTTCS, including the integration of different systems, real-time assessment, and reliability assessment are discussed.