IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advance Higher Throughput Communications and Networks for GEO and LEO satellites (3)

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DESIGN AND IMPLEMENTATION OF NEW MULTIPROTOCOL COMMUNICATION TECHNOLOGIES

Abstract

The current level of data exchange networks development requires the implementation of new technologies. It is important to organize the interaction of devices in such a way that all types of information will be transmitted within a single network regardless of the physical transmission medium. The transmission of different types of information over heterogeneous networks using different communication technologies is becoming a legacy. Industry needs a flexible environment where any moving vehicle has identification and data exchange ability . The communication technology choice greatly affects the technical characteristics of the network. New principles of data exchange in various network structures make it possible to obtain hybrid networks, increase the number of devices, and describe their interaction. At the same time, a network user gets the opportunity to use all these advantages without worrying about physical implementation. Thus, the choice of data exchange technology is critical for the functionality of the entire system in which it is used. Unfortunately, modern networks use a large number of heterogeneous technologies. To ensure communication between moving devices, such as spacecraft, aircraft, drones, trains, it is necessary to ensure the joining of disparate technologies into a single network. This requires new complex protocols and inter-technology communication equipment. Existing onboard communication networks provide high reliability and quality of data transmission. Therefore, they must go beyond the board and provide a unified data exchange, abstracting the information exchange participants from the physical features and principles of communication. To create such new technologies, it is necessary to carry out a step-by-step design of new protocols with the replacement of multi-protocol networks in favor of creating a unified technology. Moreover, existing approaches to protocol development do not formalize and solve the automation problem. A new communication protocols development methodology is proposed. It covers the entire development process from gathering of technical requirements to creating a specification and protocol prototypes. It describes the creation of specific models and CAD systems for designing and modeling complex multi-protocol networks. This will allow the creation of inter-technological bridges, a gradual transition to unified data exchange standards. These principles also described in the current article. New technologies and multi-protocol networks will allow comprehensive data exchange on board and off board of any moving objects: spacecraft, aircraft, autonomous cars. Such technologies should be supported by real-time design, configuration and analysis systems based on new scientific methods of automation, reconfiguration and synchronization of network elements.