Apr 28th, 8:00 AM

Paper Session I-A - Commercial Approach for using TCP/IP in Range Operations

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A Commercial Approach for using TCP/IP in Range Operations.

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TCP/IP (Transmission Control Protocol/Internet Protocol) as a base transport schema could be used as the mechanism for reliable and high speed data transfers between all related segments pertaining to Launch, Range, Base, Spacecraft, and Worldwide Ground Operations facilities.

Currently, many spacecraft and launch vehicles use proprietary data bus structures such as the 1553 protocol that is eventually converted to TCP/IP for usage and analysis. Typically, these systems are custom computers and interfaces with maximum data rates in the 1 MHz range which by present standards is slow and cumbersome.

The development of the TCP/IP protocol, and its standardization under the OSI (Open Systems Interconnection) computer model, combined with the advances in high-speed communication hardware, and the development of the worldwide commercial infrastructure of the "WEB" make possible this proposed change in communication topology that can provide reliable high-speed data transfers between all related segments pertaining to Launch Range, Base, Spacecraft, and Worldwide Ground Operations facilities. The basis for this proposal is the use of the TCP/IP and Internet-work router and switch scheme to perform Space-related functions. The entire world, even under developed countries, has the Internet and its connection to the rest of the world. Thus, the internet could be utilized effectively to tie launch operations, range operations, and support functions in a unified space endeavor.

The basic approach of using TCP/IP to communicate with all aspects of a system provides the advantages of higher performance "off-the-shelf hardware" MAC (Machine Access Code) addressable by intelligent routing which at a minimum should yield benefits in flexibility, reliability, speed, and compatibility. The fiscal load could be reduced since the hardware and routing-switch systems are already in place. Portable Range-Ground Operations equipment could be placed in near optimum Geo-positions, attached to commercially leased resources for connection to the "Internet Data Transfer Mechanism." Also, when this approach is implemented, overhead can be brought to a minimum, configuration simplified, and bandwidth increased to acceptable levels using devices such as GBICs (Gigabit optical interfaces), now the standard for good Internet communications worldwide.

In conclusion, higher performance, reliability, compatibility, with lower cost could be the benefit of commercially leasing Internet resources and using the TCP/IP Protocol as the basic topological frame for all operational communications.