

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
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SCOM- A TRANSCEIVER FOR SMALL SATELLITES BASED ON MIMO AND MODERN CODING
TECHNOLOGIES

Abstract

The space technology becomes more and more essential for daily live and helps to raise the standard of living. By providing GPS navigation and mobile communication, to name a few examples. With the growing demand for space based systems, the technical and economic requirements on these systems also increase. This systems have to cope not only with extrem conditions during the launch and operation in space, but also reduce volume, mass and power consumption. High cost effectiveness is underlying driver for development process. In this context, small satellites play a major role. Their mechanical properties and the relatively short development period make this class of satellites attractive for novel technologies. To meet the requirements, more innovative technical solutions for satellite subsystems are needed. Adapting proven terrestrial technologies to space mission requirements promises to be a very effective way to achieve these goals. SCOM is a very powerfull S-band transceiver for small satellites. It is capable to transmit payload data from a low earth orbit with a data rate up to 4Mbit/s. The transmission power amounts to $2 \times 0,5W$. SCOM also enables a data uplink to the satellite with a data rate up to 100kbit/s. Modern channel coding algorithms and MIMO technologies find use in SCOM. The MIMO concept is realised with dual-slant linear polarised antenna in the satellite and the ground station feed. SCOM can also be regarded as a flexible and cost-effective platform based on commercial off the shelf components. Using software defined radio principles, SCOM also serves as a platform for the practical testing of different modern, highly efficient transmission techniques for LEO satellites. This paper also represents the results of our studies about a combination of space-time-coding with modern FEC-methods like TURBO or convolution coding to achieve high noise resistance. By means of modern signal transmission methods, the efficiency of SCOM is raised while the power consumption is decreased.