

A Futuristic Look at Satellites and Satellite Communications in Twenty Years

Abstract

The business of designing and building satellites has been around for over forty years. However, only a few companies at the national and international level are still in this business. The large and necessary capital investment needed to maintain technical capabilities and the uncertain commercial and noncommercial markets have plagued the industry for many years. In such circumstances, few revolutionary technical innovations are made and encouraged.

Over the years, the majority of electronic technical advances in the satellite industry have been attributed to the “sensor” technology. Sensors are those instruments in the satellite responsible for collecting and processing the acquired data before being downlinked to earth. However, the satellite “bus structure” itself have experience relatively little technological advances over time. The time is ripe for a change. All typical spacecraft subsystems can now benefit from the technological breakthroughs that have been witnesses over the last few years. If we make it a priority to develop spacecraft subsystems that incorporate the best that electronic technology can offer, we can reduce the size of a spacecraft by at least a half from present typical designs, hence, a considerable reduction in launch, and ground processing costs.

If the economic environment for satellite builders becomes stable and profitable and if there is a commitment by spacecraft designers to keep up with technological advances, the spacecraft of twenty years from now will look much smaller and more capable than today’s counterparts. This paper addressed each of the five spacecraft subsystems: telecommunications, attitude control, command and data handling, thermal, and power. The paper goes over each of the subsystems electronic designs and outlines present technologies used. The paper then addresses how present and future technological advances can benefit the design, development and manufacture of spacecraft subsystems.