

The Evolution of GPS Receivers at Rockwell International Over Two Decades, and the Role of GaAs

Loney R. Duncan

Rockwell International Corporation
3200 East Renner Road
Richardson, Tx 75082-2402
972.705.1640 Fax 972.705-1643
E-Mail lr Duncan@corp.rockwell.com

GPS Receivers have evolved from the very large experimental units of the 1970s to the highly miniaturized and complex, ubiquitous engines and receivers of today.

This remarkable change has resulted from optimized architectures, the digitization of receiver correlators through pervasive VLSI implementation, and the use of complex GaAs MMICs in the receivers' RF/IF circuitry.

This address will trace that evolution from some of the first military implementations, to later DARPA sponsored experimental work that led to some of the first commercial engines, and then full circle to large quantity military and commercial units of today.

During that evolution, GaAs implementation took on several forms. First used only in receiver LNAs, complex GaAs MMICs later encompassed the entire RF and IF sections of these receivers. Further design optimization would better balance the use of GaAs and CMOS or bipolar silicon in the total RF/IF circuitry.

In addition to the extensive silicon and GaAs circuit integration of these GPS receiver engines, advanced packaging concepts were employed to further reduce their physical size. All of these miniaturization techniques were chosen to be compatible with aggressive surface mount technology employed on Rockwell's manufacturing lines.

Finally, an example of GPS/data link aircraft surveillance toward the free flight concepts of the next decade is demonstrated in this presentation.