ABSTRACT

Cost is an important aspect to most new communications systems. However, in military systems, performance concerns generally dominate initial development. Economic refinements to second and third generation equipments result from competitive pressures after functional requirements have stabilized. Satellite communications terminal requirements have not been stable primarily because economically attractive solutions to satellite jamming and physical attack vulnerabilities have not been collectively identified.

Recognizing the incomplete resolution of the threat issue, this paper makes a forecast of what second and third generation ultra high frequency (UHF) satellite terminals could be like. An improved terminal concept is described which suggests near term modifications to present UHF satellite terminals as well.

Satellite terminal line replaceable units (LRUs), which possess unique system functions in present UHF satellite systems, are reconsidered using ground rules which exclude restrictions imposed by present satellite designs. Terminal segment costs are assumed to dominate system acquisition costs, justifying increased space segment complexity.

Considerations guiding the low cost UHF airborne terminal concepts in this paper are shown in the table below. Terminal concepts are constrained by the MAC, SAC, and TAC airborne environments as it affects personnel and equipment but not by current space segment designs.
Design of a low cost terminal is an iterative system and equipment configuration process which minimizes the number of LRUs, the number of components, the number of interconnections, and installation impacts. This paper will discuss lower cost approaches to the antenna subsystem, RF power amplifier, receiver front end, synthesizer, IF bandpass filtering, modem, and I/O and control. Improved performance as well as reduced cost can result.

The low cost terminal concepts are supported by a technology data base. Detailed cost estimates are beyond the scope of this paper, but cost reductions are implied by the decrease in the number of LRU’s, the weight and volume of an LRU, and the number of functions provided. Implications for the space segment and overall system will be discussed.