SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Fixed and Broadcast Communications (5)

Author: Dr. Ahmad Talebzadeh
Asia-Pacific Space Cooperation Organization (APSCO), China, talebzadeh@apsco.int

Prof.Dr. Firouz Shahrokhi
Vanderbilt University, United States, shahrokhi729@gmail.com
Mr. Hooman Jazebizadeh
Beihang University, China, hooman.jazeby@gmail.com
Ms. Zeinab Movahedi
Beihang University, China, zeinabmovahedi@yahoo.com

DEVISING A COMMUNICATIONS SATELLITE SOLUTION TO MEET THE NEEDS OF THE CHANGING WORLD IN A REGIONAL PERSPECTIVE

Abstract

The common phrase used by all politicians is "change", or "change is coming". The key questions are; what is the change, when and for what purpose. The change for the emerging space market in developing countries should be accepted and be targeted to win. Hence, the focus would be on developing new technologies and new solutions in this regard. A major commitment has already been made to a new Race for Space. This race isn't between competing nations, and it's not politically driven. It's a goal in commercial opportunities, mainly in geostationary satellite communications (SATCOM) market. This paper deals with analyzing the recent activities of the developing countries in SATCOM market and devising a novel and cost-effective solutions in commercial and regional environment to meet the needs of those countries.

The paper first describes the substantial differences between the government and commercial domain and dramatics shift from governmental to commercial in the SATCOM market. For instant, commercial and government customers today each account for about half of the industry's revenues in satellite manufacturing. And, as commercial opportunities grow, revenues will reflect this shift more and more.

Also given is a survey on operational or scheduled SATCOM systems to analysis needs in market and extract the requirements for the new solutions. The survey mainly focused on the developing countries in Asia-Pacific region containing Pakistan, Turkey, Azerbaijan, Vietnam, Laos, Thailand and Mongolia. The requirements include superior coverage area, manufacturing period, life expectancy, types of services, multi frequency band utilization and transponder's quantity and specification.

The paper then discusses the devised concept of the telecommunications satellite based on Design Structural Matrix (DSM) method. The concept changes from domestic to regional use and implements multiple payloads, e.g. serving both meteorologists and air traffic controllers, to meet the expanding demands with scalable allocation of power and spectrum and to enter the commercial arenas. Aiming to show the feasibility of the concept, the paper addresses the promising technologies integrated in the satellite configuration specially antenna system. In addition, digital signal processing is employed to optimize utilization of the bandwidth and to create an onboard adaptive control on the link parameters particularly in combination with advance antenna technologies such as active phase antennas and hopping spot beam. In conclusion, the system specification of the satellite is outlined in this paper following with implementation considerations in regional organizations such as APSCO, APRSAF, ESA, ASEAN and OIC.