



Performance study of a code division multiple access protocol for LEO constellations

S. Salmi¹, S. Haddad² and M. Benslama²

1 20th of August 1955 University, Skikda, Algeria.

2 Laboratory of Electronics, Mentouri University, Constantine, Algeria.

E-mail: sasalmi1993@yahoo.fr.

(Received 22 September 2007; accepted 12 February 2008)

Abstract

Code division multiple accesses (CDMA) has been proposed for personal communications networks for both terrestrial and satellite links. However, mobile satellite systems are expected to play a significant role in providing users with worldwide communication services. In such context, low earth orbit (LEO) satellite constellations seem to be a good solution to attain a global coverage and to allow the use of low-power lightweight mobile terminals. This paper studies the performance of a MAC (medium access control) protocol based on the CDMA technique. This study is based on voice and data users. Voice users are considered as ON/OFF sources and data users as ABR sources.

Key words: *LEO satellite systems, Multiple access, Protocol*

I. Introduction

Wireless access to satellite telecommunication networks represents one of the main topics of research activities by researchers, developers, manufacturers, and service providers throughout the world. Satellite networks can meet a variety of data communication needs of businesses, government, and individuals. Due to their wide-area coverage characteristics and ability to deliver wide bandwidths with a consistent level of service, satellite links are attractive for both developed and developing countries. One of the third generation systems, Universal Mobile Telecommunication System (UMTS) will consist of both Terrestrial (T-UMTS) and

satellite systems (S-UMTS), towards a world-wide coverage (Dekorsy and Bureck, 2005). The proposed satellite systems are based either on geostationary (GEO), medium (MEO) or low earth orbit satellites. When compared to GEOs, LEO satellites have shown the advantage of a higher degree of frequency reusability, smaller end-to-end delays, and a lower power requirement for handled terminals. A Low Earth Orbit (LEO) satellite network system is made up of a constellation consisting of a number of satellites in circular or inclined orbits at altitudes ranging from 500 km to 2000 km (Bastug, 2005; Castanet *et al.*, 2005).

In a code division multiple access (CDMA) system, multiple users are allowed to share the limited resources of frequency and time. There are two primary CDMA