

SPACE SYSTEMS SYMPOSIUM (D1)
Lessons Learned in Space Systems (5)

Author: Prof.Dr. Alim Rustem Aslan
Istanbul Technical University, Turkey, aslanr@itu.edu.tr

Dr. Bulent Yagci
Istanbul Technical University, Turkey, bulent.yagci@itu.edu.tr

Mr. Ertan Umit
Istanbul Technical University, Turkey, umite@gumush.com.tr

Mr. Mustafa Erdem Bas
Istanbul Technical University, Turkey, erdem.bas@itu.edu.tr

Mr. Mehmet Şevket Uludağ
Istanbul Technical University, Turkey, uludagm@itu.edu.tr

Mr. Okan Emre Ozen
Istanbul Technical University, Turkey, ozenok@itu.edu.tr

Mr. Murat Suer
Istanbul Technical University, Turkey, suerm@gumush.com.tr

Mr. AHMET SOFYALI
Istanbul Technical University, Turkey, sofyali@itu.edu.tr

Dr. Cuma Yarım
Istanbul Technical University, Turkey, yarim@itu.edu.tr

LESSONS LEARNED DEVELOPING A 3U COMMUNICATION CUBESAT

Abstract

A 3-Unit CubeSat, called TURKSAT-3USAT, is developed for voice communication in Low Earth Orbit (LEO). The spacecraft is planned to be launched by end of April 2013 from China with a LM2D launch vehicle. The 3USAT payload is a linear transponder operating in VHF/UHF. Most subsystems of the CubeSat have redundancy which is provided by COTS equipment and inhouse developed systems. The two payload are developed genuinely by project team. The payload power requirements results in excess temperatures exceeding 100oC. A remedy was developed to remove heat resulting from high power amplifier. Other problems encountered and resolved include grounding issues of electronic and RF systems, the transfer of data and power using PC104 form factor between 1U sections of for 3U COTS structures, thermal vacuum testing of payloads with supporting equipment outside of the chamber, cabling and "cold solder joint" among others. The 3USAT also includes many sensors and a camera for taking pictures. The full paper will discuss in detail the encountered problems and methods developed to resolve them.