

IAF SPACE OPERATIONS SYMPOSIUM (B6)
Ground Operations - Systems and Solutions (1)

Author: Mr. Shiwang Xing
Beihang University, China, xingshiwang@buaa.edu.cn

Dr. Xinsheng Wang
Beihang University, China, xswang@buaa.edu.cn

Mr. Jiaming Wang
Beihang University (BUAA), China, 441355785@qq.com

Mr. Zhixiong Shi
Beihang University (BUAA), China, 1186442157@qq.com

Mr. Liming Fan
School of Astronautics, Beihang University, China, fanlimingbuaa@126.com

APSCO GROUND STATION NETWORK DESIGN AND APPLICATION

Abstract

During the past decades, small satellites in the LEO orbit have played an important role in the fields of space remote sensing, communication, scientific exploration, new technical demonstration and society public services. The ground station (G.S.) is the key ground facility to track satellite, receive telemetry data package and send telecommand. For an established G.S., the TTC coverage limitation and the low service efficiency are the two common problems.

In order to solve the two problems and support APSCO Student Small Satellite (SSS) project, which is the largest basic activity of in-orbital micro/nano-satellite technology demonstration and the hand-on practice space engineering training program in APSCO(Asia-Pacific Space Cooperation Organization), Beihang university proposed the APSCO G.S. network based on the obtained UHF/VHF band and/or S/X-band ground stations which are distributed in APSCO member states. The APSCO G.S. network is defined the standard network interface, integrated the ground station resources and improved the coverage of the telecommand, telemetry and control and shared the satellite application data for the APSCO SSS project.

In this paper, it surveyed the established G.S. network in the worldwide. It presented the G.S. network system design, network topology and interface design. APSCO G.S. network is mainly composed of mission control center(MCC) and Data Process and Archive Centre(DPAC), and various MS ground station nodes. When connecting with the different ground station nodes, the G.S. specific interface is designed. In order to schedule G.S. resource allocation, management plan, receive satellite telemetry data and payload data, generate the satellite telecommand, and provide international space technology engineering practice education and training.

At present, Beihang has established the UHF/VHF/S/X-band ground station and the MCC and DPAC. At the same time, we have also conducted network intercommunication tests with other sites in China and APSCO member states through network. The work results will be analyzed in the paper.