

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
Mobile Satellite Communications and Navigation Technology (5)

Author: Dr. Yong XUE

China Academy of Space Technology (CAST), China, xy.afrie@gmail.com

Dr. Yongxuan Xiao

China Academy of Space Technology (CAST), China, xiyx@163.com

Dr. Dong Chen

China Academy of Space Technology (CAST), China, phd.dchen@gmail.com

Mr. Naijin Liu

China Academy of Space Technology (CAST), China, naiking@gmail.com

Mr. Xiaojin Zeng

China Academy of Space Technology (CAST), China, xjzenggrey@gmail.com

RESEARCH ON EFFECT OF EXCITATION COEFFICIENT ERROR ON THE PERFORMANCE OF  
MULTIPLE-BEAM REFLECTOR ANTENNAS**Abstract**

Single-aperture multiple-beam reflector antennas, forming each composite beam with feed array, are new generation telecommunication satellite antennas. This antenna design forms composite beams through adding up element beams weighted by the feed excitation coefficients. Using different feed excitation coefficients, multiple beams are formed. The composite beams performance is determined by the feed excitation coefficients, and the feed excitation coefficients error affects the accuracy of the composite beam patterns. Another performance parameter of multiple-beam antennas, the inter-beam isolation represented with  $C/I$ , depends on the pattern of composite beams. So the excitation coefficient error also affects the  $C/I$  parameter of the multiple-beam antenna. Therefore, it is important for the design and development of multiple-beam reflector antennas to analyze the effect of excitation coefficient error on the antenna performance. Using probability statistical methods, the effect of feed excitation coefficient error on the pattern,  $C/I$  of the composite beam is analyzed through simulating a single-aperture multiple-beam reflector antenna, and the quantitative relationship curves are presented. The analysis results can be used to determine accuracy requirement of the feed excitation coefficients when the multiple-beam reflector antennas are designed and developed.