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SPACE ASSEMBLY TECHNOLOGY OF LARGE MODULE TYPE ANTENNA

Abstract

As the development of space technologies, more and more larger antenna is required, especially in space-based radar, remote sensing satellite, and so on. the ultra-large deployable antennas will be assembled on orbit, since the space station has the advantage of more room, more carrying capacity, abundant energy, recharging and human participant. The concept of the on-orbit assembly is discussed, based on the space station and astronauts. The present situation of the on-orbit assembly technology is summarized. The module design technology of the unit-split type space antennas is developed. The structure of the reflector was projected, and also a new kind of module used for assembling the large reflector was put forward to illustrate the methods of how to assemble the reflector in space. A proto of the module with 4.8m diameter was manufactured, as well as the mechanisms for connecting the modules. Several experiments were developed to test the module's performance, including the deploying experiment of the module, the deployment mode of the module, the impact of deploying the module. In virtue of three module proto' simulation assembling experiments, the assembled in space antenna reflector was proved logically and feasible, According to the task requirement of the on-orbit assembly of the unit-split type space antennas, the schemes of the on-orbit assembly technology and ground laboratory experiments are investigated. The work affords some useful references for developing our own on-orbit assembly technology of large space antennas.