

# The Development of Space Flexible Deployable Structure Technology

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**Abstract** In this paper, the space flexible deployable structure technology was introduced briefly. The current development status of three types of space flexible deployable structure were described including the space tether system, the space inflatable structure and the deployable membrane structure. For the space tether system, missions that had been carried out or proposed were summarized including the Gemini-11 in 1966 to the T-Rex in 2010. The author considers that the space tethers will be more widely applied in the future. For example, the electrodynamic tether has noteworthy application prospect because the problems of space debris are aggravating. For the space inflatable structure, some projects were introduced such as the IAE, the ARISE, the Transhab and so on. Specially, the first space inflatable structure executed in China, an inflatable gravity gradient bar with three meters in length was described. For the deployable membrane structure, the typical applications such as the sunshade film of JWST and the solar sail in FASTSAT satellite were introduced. In fact, with the launch of the first satellite DFH-1 of China in 1970, a deployable membrane structure which was called the observation body was successfully tested and met the requirement of being visible by human on the ground. The key technologies of space flexible deployable structure were generalized briefly. The author thinks that the most important key technologies include deployment methods, folding techniques, space flexible materials, simulation and testing techniques. Lastly, based on the current situation and the key technologies of the space flexible deployable structure technology, the development suggestions were presented in brief.

**Keywords** Flexible deployable structure      Space tether system      Inflatable deployment structure      Membrane structure