

Study of high precision measurement methods for CFRP used in High Accuracy Large Deployable Structure and investigation CFRP degradation due to radiation

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High Accuracy Large Deployable Structure is an indispensable technology for radio astronomy and communication satellites. It has capability to accommodate up to high frequency band. By this progress, the development of communication technology and further astronomical achievement is expected in the future. The material of high accuracy large deployable antenna is required to have lightweight. To meet these requirements, Carbon Fiber Reinforced Plastic (CFRP) materials are often used as radial ribs. For example, it has been used in large deployable antenna for Engineering Test Satellite, ETS-VIII, launched in December 2006. However, CFRP is exposed to the harsh space environment in orbit. Deployable antenna may not be able to maintain the precision because it will change the physical properties of CFRP under the influence of radiation.

In this study, we evaluate the change in physical properties due to radiation degradation of CFRP and reveal the cause of the change in the physical properties of CFRP from the view point of the change in physical properties of carbon fiber and resin constituting the CFRP. In this study, we will evaluate the change in physical properties due to radiation degradation of carbon fibers constituting the CFRP. Test method to evaluate the change in physical properties by comparing the characteristics of the irradiated and virgin samples by tensile testing. The detail of experimental results would be presented in symposium.