

IAF SPACE SYSTEMS SYMPOSIUM (D1)

Lessons Learned in Space Systems: Achievements, Challenges, Best Practices, Standards. (5)

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LESSONS LEARNED AND BEST PRACTICES FROM THE BIRDS-5 PROJECT

Abstract

The BIRDS program started in 2015 at Kyushu Institute of Technology. In this program, young professionals from non-space-faring countries join the satellite projects as graduate course students and develop 1U CubeSat with Japanese students. In July 2020, the BIRDS-5 project, the fifth generation of the BIRDS program began with students from Uganda, Zimbabwe, and Japan. BIRDS-5 project built one 1U CubeSat each for Uganda and Zimbabwe and one 2U CubeSat for Japan in around 2 years. The BIRDS-5 project applied the Lessons Learned from BIRDS-1, -2, -3, and -4 and improved technology and management points to reduce the development time and cost and avoid making the same mistakes as previous projects. The three satellites were released from the International Space Station (ISS) in December 2022. However, no signals have been received from all the three satellites since their deployment. The BIRDS-5 team started to perform Fault Tree Analysis (FTA) for possible causes. Extensive tests were performed using the backup satellite to replicate the phenomena in orbit. Tests were repeated to deny any unnoticed issues during the satellite development. This paper describes the improvements that were made by BIRDS-5 project based on the heritage from the previous projects and summarizes the unpredicted issues that appeared in the BIRDS-5 project. In addition, the results of the failure investigation and suggestions to prevent future projects from making the same failures are also detailed. This study will be beneficial for all the small satellite developers as lessons learnt while developing satellites using commercial-off-the-shelf components in limited time.