Abstracts

Collaborative Rocket Experimental Project between Tokai University and University of Alaska Fairbanks

by

Fumio TOHYAMA and Joseph G. HAWKINS
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Abstract

The collaborative rocket experiment that is called the Student Rocket Project (SRP) has started in 1995 between Tokai University Shonan (TUS) and University of Alaska Fairbanks (UAF). UAF is the only one university to have a rocket launch site in the world. This program provides students of TUS and UAF with the opportunity to design, to construct and to test sounding rocket payloads that are launched on a non-interference basis from Alaska. This scientific educational program has proven to be very effective in providing students with practical, real-world engineering design experience. The program also allows students to participate in all phases of a sounding rocket mission, in contrast to more traditional sounding rocket or spacecraft projects in which students are only involved with the scientific instrumentation and data analysis.

From August 1996 to March 2001, a total of 41 TUS students and professors have visited Alaska 6 times and a total of 9 UAF students and professors have visited Japan 4 times to hold many SRP meetings and workshops. We basically design, construct and test onboard instruments or mechanical systems and we also make hybrid rockets too. For their successful launch, students are working on computer designing for electronic circuits or separation system, on wind tunnel testing and launching for model rockets and on combustion testing for hybrid rockets.

In January 2000, the first collaborative sounding rocket of that the motor was supplied by NASA, was launched from Alaska and all of payloads were successfully carried to the apogee of 89 km high. Tokai students constructed a fluxgate magnetometer for detecting rocket attitudes during the flight and the magnetometer was carried on the payload. We get a good data of rocket attitude performance on the experiment. We describe about the SRP collaboration and a result of the Tokai instrument in the sounding rocket experiment.

Keywords: rocket experiment, international collaboration project, Student Rocket Project, fluxgate magnetometer

*1 Professor, Department of Aeronautics and Astronautics.
*2 Professor, Department of Electrical Engineering, University of Alaska Fairbanks.

Study on Noncontact Support and Transportation of a Thin Steel Plate

by

Yasuo OSHINOYA and Kazuhiro ISHIHATA
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Abstract

Cold-rolled steel sheets, such as steel plates for automobiles, are conveyed on rollers to undergo many processes, such as rolling, plating, coating and drying ultimately, the steel plates are rolled as products. In this type of continuous web handling system, production lines are generally constructed for the purpose of improving production yield and productivity while suppressing energy loss, coating nonuniformity and flaws as much as possible. However, these problems have conventionally been tackled via experience-based techniques accumulated at each production site and systematic approaches to cope with these problems have not been sufficiently developed. Under such circumstances, a new method involving the application of electromagnetic technology is under consideration for improving the surface quality of steel plates of which deterioration of which has been observed in the conventional contact conveyance system. In this thesis, we discuss four aspects concerning the electromagnetic levitation control of a sheet steel which authors are researching recently, that is, effective use of permanent magnets, noncontact horizontal positioning control, conveyance control, and elastic vibration control for the thin steel plate with free edges.

Keywords: Electromagnetic Levitation, Steel Plate, Handling System, Permanent Magnet, Elastic Vibration

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