

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Interactive Presentations - IAF MATERIALS AND STRUCTURES SYMPOSIUM (IP)

Author: Mr. Sergio Rios Rabadan
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico, intermezzo@prodigy.net.mx

Ms. María Guadalupe Ortega Ontiveros
Facultad de Ingeniería-UNAM, Mexico, guadalupe.ortega.ontiveros@outlook.com

Dr. Dafne Gaviria Arcila
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico, dafne.gaviria@comunidad.unam.mx

Mr. Saúl Zamora Hernández
Universidad Autónoma de Querétaro, Mexico, szamora06@alumnos.uaq.mx

Dr. Rafael-Guadalupe Chávez-Moreno
School of Engineering, National Autonomous University of Mexico, Mexico, rchavez@comunidad.unam.mx

Dr. Alberto Ramirez Aguilar
Universidad Nacional Autónoma de México (UNAM), Mexico, albert09@unam.mx

Mr. Eduardo Muñoz Arredondo
INSTITUTO TECNOLOGICO DE QUERETARO (ITQ), Mexico, l16140994@queretaro.tecnm.mx

COMPUTER AID SIMULATION TO OBTAIN INTERNAL STRESS FROM STATIC AND RANDOM
VIBRATION ANALYSIS OF THE 1U K'OTO NANO SATELLITE.

Abstract

The High Technology Unit (UAT) of the National Autonomous University of Mexico (UNAM) in conjunction with the Secretariat of Sustainable Development (SEDESU) of the state of Querétaro works together in order to generate and train new Mexican talent through the development of a nanosatellite Cubesat type of 1U with the name of K'oto. The project will allow the development of research as well as the acquisition of the experience of new generations of space professionals people for Mexico throughout the life cycle of a cubesat satellite since the design to launch.

In the practice, there are many custom-developed and documented methods to perform computer simulations to obtain reliable results depending on the industry, type of application, software, boundary conditions among many other variables. K'oto is a project that seeks to develop and investigate methods to perform simulations of nanosatellite mechanical structures that adjust to space needs and requirements. This writing shows the method of analysis by simulation of static systems, modal analysis, and random vibrations of a 1U structure, also shows mesh type, contact types and all the steps that this simulation has. It also shows the results of internal stresses due to input conditions. which are provided by the JAXA JEM Payload Accommodation Handbook - Vol 8 - Small Satellite Deployment Interface Control Document.

Finally, it concludes with a method that was found during the development of K'oto research that gathers in one project different methods from different disciplines of simulation that allow achieving the goals of the project by reducing computational resources without affecting the results obtained.