

From Sounding Rocket to Suborbital and Orbital Experiments: Structural Health Monitoring Research and Education

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Abstract

Today we are witnessing a considerable expansion of commercial space activities and substantial increase in number the of private enterprises entering commercial space market. This trend is driving the demand for engineering professionals and, consequently, is affecting education, research and outreach directions at universities. This contribution reports New Mexico Institute of Mining and Technology's emphasis on students' hands-on experience in design, development, and launch of space systems ranging from sounding rocket to sub-orbital and orbital payloads. In this process, cooperation with commercial space companies is highlighted and an approach for the integration of skills essential to the space industry into the engineering curriculum is suggested. Example of students' involvements in design, fabrication and launch of sounding rockets is presented. Further developments are illustrated with students' contribution to design and fabrication of sub-orbital and orbital payloads for structural health monitoring (SHM) experiments. Payload design and development served as a unifying theme for space research and education. Results of sub-orbital flight experiments are reported and their importance to commercial space industry is discussed. Details of a payload for SHM experiments on International Space Station (ISS) are presented and importance of such projects for education of a new generation of scientists and engineers is emphasized.