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Evolution of mission, design and utilization trends of small and miniaturized satellites in developing countries

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Over the past 25 years more than 50 countries have established space programs for building and acquisition of technology of small satellites. Small satellites are those weighting more than 20 Kg to less than 200 Kg. They are designed along the classical lines of design to perform typical missions like those of larger satellites. The first part of this paper focuses on the evolution of some of the most visible of these satellite programs in developing countries. Miniaturized satellites comprise various categories including microsatellites, nano-satellites and CubeSats. These are built to a much smaller sizes and weights through miniaturization of components and subsystems. This development has changed the focus of small satellite research from technology and operation to mission and utilization. The question now for satellite builders is not how to build, test and operate the satellite, but rather in what mission it could be employed? Since the emergence of this trend of building very small or miniaturized satellites, a large number of satellites have been launched and several categories and configurations were developed. However, a focus of the main mission of this group of satellites did not materialize. This paper attempts to trace the major design and utilization trends of this category of satellites in developing countries. This includes design trends centered on production of integrated miniaturized components and subsystems, mission trends focusing on fleet launches and satellite formation and utilization trends varying from classical uses such as remote sensing to rescue missions and education.

Biography

Mohamed B Argoun is a Professor of Dynamics and Control of Aerospace Vehicles in Department of Aerospace Engineering at Cairo University, Egypt. From 1999 to 2008, he was Director of the Egyptian Space Program and Manager of Egyptsat-1 satellite project. During the period 1998-2003, he was General Secretary of the Space Research Council in Egypt and the Head of the Space Sciences Division at National Authority of Remote Sensing and Space Sciences. From 1983-1988, he was a Professor of Mechanical Engineering at University of Wisconsin Milwaukee and worked at Atomic Energy of Canada Ltd. His research interest includes Systems Control Theory.

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