

45th STUDENT CONFERENCE (E2)
Educational Pico and Nano Satellites (4)

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INNOVATIVE SMALL SATELLITE STRUCTURAL CONCEPT FOR EFFECTIVE SYSTEM
INTEGRATION**Abstract**

Small satellites projects at the ending stages of their completion encounter the major problem of wiring all the different components and systems together. Wire harnessing and routing has turned out to be a major issue especially for small satellites who in their pursuit for miniaturization have already made a variety of trade-offs for space. Through this paper we want to demonstrate a new structural design that will incorporate wiring strategy as the primary factor of consideration for baseline design. The main idea consists of making conducting pathways for electric signals within the primary structure by providing a layer of conducting material sandwiched between two layers of insulator. This conducting material runs as a network throughout the structure and whenever a connection needs to be made with a component a conducting lead may be branched out from an appropriate location close to the component and a connection can be made. This strategy solves a number of problems like minimizing unwanted complications during wiring phase, no need of supports for bridging of wires from one face of satellite to other, no need of special harnessing points for each and every wire harness, elimination of harness paraphernalia like cable ties, cable tie mounts, heat shrink sleeves and kapton tape thus saving a lot of mass and money. The conducting pathways can also consist of hollow lanes cut into the primary structure with wires passing through them. This might be easier to fabricate but might end up compromising on the strength of the primary structure; the problem can be averted by using materials stronger than aluminum like steel or titanium. Through this paper we argue that if such a system can be implemented in a small satellite then a lot of extra space can be directed for the implementing the payloads of the mission thus increasing the scope of the number of experiments that can be implemented through a small satellite thus increasing their cost effectiveness thereby motivating even more universities to venture into small satellites.