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ATTO/FEMTO SATELLITE: A SURVEY ON THE APPROACH, DESIGN, CAPABILITIES AND
MISSIONS

Abstract

As a result of recent advancement in the miniaturization of electronic and mechanical components, smaller spacecraft such as nano/pico and even femto/atto satellites can be made. Femto/Atto Satellites are a new class of small satellites. There are approximately 100 missions/projects on femto/atto satellites at different stages. Compared to their bigger counterparts these satellites are rather simple with respect to their design and capabilities. Most common approach is to have one or more simple sensors, an MCU, at least download capability and power generation/storage.

Despite these satellites becoming more mainstream within the academia no common structured approach is available. To combat this gap and in order to provide a foundation for the atto/femto satellite design, a survey on sub-100-gram satellites, especially atto/femto satellites, has been made. Aim of this survey is to provide an overall information of current atto/femto satellites and recommend a system engineering approach for their end-to-end design. Atto and Femto satellite classes are combined because of their similar approach regardless of their size. Such satellites rely on functionalities on a single board/system unlike bigger satellites where the subsystem concept can be implemented. Each functionality in an atto/femto satellite is a smaller representation of a subsystem.

The results of this survey will provide a better understanding on how this class of spacecraft progressed over time and will foster a better development capacity for atto/femto spacecraft.