

22nd IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Generic Technologies for Nano/Pico Platforms (6B)

Author: Dr. Raz Itzhaki Tamir
IAI MBT Space, Israel

Mr. Daniel Rockberger
Israel

HOBBIT – A STANDARD, HIGH RELIABILITY NANO-SATELLITE ELECTRONIC BUS

Abstract

Nano-satellites are no more a phase. They have entered the consensus as one of the biggest drivers of the satellite industry. In two years it is forecasted that the amount of nano-satellites shall surpass the amount of all other satellites combined. The main reason for the nano-satellites prosperity, are the agreed standards, the minimization and cost effective of major subsystems.

The need to create affordable subsystems forces industry to re-invent design and manufacturing procedures, to base design on relatively cheap labor (students, inexperienced engineers and open communities) and to compromise on components quality. This methodology enables many satellites to be built and launched. Thus the database of successful missions and lesson learned is growing rapidly. The downfall of this approach is the many faults nano-satellites experience during launch and in the first stages of their operation.

The outcome of this issue has surprisingly been positive, leading the large players in the industry to take the matter seriously and develop many systems for cubesats, mostly due to the need for internal cubesat projects but also for other institutions and to be sold on the market.

This leads to an enhancement of innovation, fast development and low cost RD from the traditional industries, the products developed do not compromise on the reliability or performance and are price competitive.

MBT space division of Israel Aerospace Industries, for example, has developed a space qualified Electronic nano-BUS (cubesats compatible) containing an onboard computer, power conditioning unit, power distribution unit, GPS unit [expected 2015], transponder Unit [expected 2015].

The bus includes choices of space graded components where critical, and industrial (with safety measures for latch up and SEU) where not critical. As in full scale space systems it has calculated reliability factors such as MTBF. The BUS (named "Hobbit") is aimed to answer the reliability and performance issues that today's cubesat system have.

Most small satellite developers purchase different systems from different vendors, the compatibility and standardization lacks and causes many integration problems and failures.

One initiative from the Kyushu University in Japan is to reach an ISO standard for the development and manufacture of cubesat components. This bus system was designed to meet both goals, to be able to interface with other common off the shelf products and sensors, and also be a full bus system from one vendor and thus avoiding compatibility issues.