

22nd IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)

Space Technology and System Management Practices and Tools (3)

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SMALLER SATELLITE RESEARCH AND DEVELOPMENT PROGRAMS**Abstract**

The major purpose of this study is to investigate the uniqueness and importance of the program and system engineering managements in the CubeSat and smaller satellite research and development (RD) programs. To be the major roles and responsibilities of space program management and system engineering groups, they are to ensure the smooth execution and successful accomplishment of the program “on schedule”, “on budget” and “on quality”. Compared with the micro (mass from 11 to 200 kg), or small (mass from 601 to 1200 kg), or large satellite (mass from 4201 to 5000 kg), there are many specific features and advantages in the CubeSat and smaller satellite constellations. The group of CubeSat and smaller satellites consists of nano (mass from 1.1 to 10 kg), pico (mass from 0.1 to 1 kg) and femto (mass smaller than 0.1 kg) satellites. However, it does not mean that the program management and the system engineering management are not important or could not be followed in the RD of the CubeSat and smaller satellite programs. Actually, in order to make sure the reliability and quality of the CubeSat and smaller satellites, the program and system engineering managements must be considered as the “miniature” of a usual program for micro/small satellite and above. Major features and advantages of these kinds of satellite constellations are: low cost in RD, low launching cost (even can be further lowered by using piggyback launch), easy for mass production, to be used for global communication, to form formations for global data collection, to be deployed in-orbit for inspecting large satellite and space station, to be a test bed for qualifying new hardware and software, easy for education and outreach purposes, etc. The investigation shall include three major parts: (1) program and system engineering managements for the micro and above satellite RD programs, (2) the uniqueness of the nano and below satellite RD programs, and (3) and importance of the program and system engineering managements in this kind of RD programs.