IAF SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems (1)

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A CONCEPTUAL SYSTEM ANALYSIS OF MICRO SATELLITE CONSTELLATION

Abstract

Nowadays, satellites are often manufactured as a large-scale, expensive, highly reliable systems with long-life expectancy that cannot be replaced in a short period of time in case they are lost. Thus, the need of high-resolution images is met by satellites operating at an average orbital height of about 600 km – 700 km, with a development time of 4-5 years and mass over one tone and requiring large mirror diameters. New Space is a global industry of private companies and entrepreneurs who primarily target commercial customers; they are backed by capital at risk, which is seeking a return, and seek to profit from innovative products or services developed in or for space. It is no coincidence that so many organizations are embracing the weight, cost, and quick deployment advantages of small satellites constellations for missions ranging from imagery to communications. Full suite of daily global monitoring data and analytics solutions will help drive critical decision-making for aid organizations, businesses, international NGOs, and governments. In this paper, a conceptual system analysis describes a micro satellite constellation for earth observation mission, aim of which is to minimize the size, mass and complexity of each satellite based on fundamental requirements which are as follows:

- The system shall acquire high-resolution images on a daily basis from all around the world,
- Mass of satellite shall be maximum 100 kg,
- Satellite GSD (Ground Sampling Distance) shall be 50 cm at nadir,
- The system shall use COTS equipment which exists in the market.