

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)  
Access to Space for Small Satellite Missions (5)

Author: Mr. A.C. Charania  
United States

Mr. Dominic DePasquale  
SpaceWorks Enterprises, Inc. (SEI), United States

Mr. Seiji Matsuda  
IHI Aerospace Co, Ltd., Japan  
Mr. hideki kanayama  
CSP Japan, Inc., Japan

OVERVIEW OF EARTH-TO-ORBIT NANO-SATELLITE LAUNCH MARKETS AND THE  
NANO-LAUNCHER SERVICE

**Abstract**

Even though the global interest in nano to microsatellites (> 100kg) is increasing, there is a large gap in affordable and dedicated launch options for such projects. Many nanosatellites (<10 kg) are used for educational purposes, and within the past few years nanosatellite applications have expanded to on-orbit technology demonstration/experimentation, telecommunications, and earth observation. Such a growing market is ever desperate for affordable launch options. Current options include ride shares and piggybacking on medium to heavy expendable launch vehicles. Yet with such options, nanosatellite customers have no control over launch schedule and desired orbit. New options would be a valuable service to the ever increasing global community of nanosatellite developers. This paper reviews the landscape of the microsatellite launch market. Specifically, identifying a business case for a dedicated nanosatellite launch vehicle requires an understanding of global nano-launch demand and customer requirements. This paper discusses results from a preliminary market assessment of nano-launch services, specifically for the nanosatellite (1-10 kg) class of orbital payloads, and analysis of the 1-100 kg range of suborbital payloads. A summary of historical number of launches and payloads deployed per year is provided, along with a projection for future demand of small satellite launch services. Emphasis is placed on orbital nanosatellites, with larger small satellites and suborbital payloads also addressed. A dedicated nano-launcher for such satellites is currently being designed based upon derivatives of existing sub-orbital expendable launch stages (namely the ISAS/JAXA S-520 and SS-520 solid rocket stages) coupled with an existing high speed aircraft. Such a Nano-Launcher solution is also described as a potential provider of launch services for the markets identified in the first part of the paper.