SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Launch Vehicles in Service or in Development (1)

Author: Mr. Ramakrishnan Sundaram
Indian Space Researh Organisation, India

Mr. HUTTON R
Indian Space Research Organization (ISRO), India
Mr. SOWMIA NARAYANAN L
Indian Space Research Organization (ISRO), India

INDIAN PSLV – A VERSATILE LAUNCH VEHICLE WITH MULTI-MISSION CAPABILITY

Abstract

The Indian Polar Satellite Launch Vehicle (PSLV) developed in early 90's with the objective of deploying the Indian Remote Sensing (IRS) satellites into polar orbits, has evolved into a versatile and reliable launcher with a track record of successfully performing a variety of missions including Chandrayaan-1, the Indian Mission to Moon, and the much acclaimed Mars Orbiter Mission (MOM). As on date, PSLV has accomplished an unbroken string of 37 successful missions and has deployed 44 Indian spacecrafts and 79 satellites from other countries.

The four stage launcher with solid booster, liquid propellant second stage, a composite solid third stage and a pressure fed liquid upper stage weighs about 300 ton at lift-off and can deliver up to 1.7 ton in Polar Orbit and 1.2 ton into Geosynchronous Transfer Orbit. The six solid propellant strap-on motors augment the payload mass. The restartable, multi-burn liquid upper stage has greatly enhanced the versatility of PSLV to undertake a wide spectrum of multi-satellite deployment missions.

The evolution of PSLV as a robust launcher in terms of payload mass growth as well as complex mission capability has been through a series of well controlled hardware and software augmentation implemented concurrently during the operational launches, without compromising the mission reliability. The key elements involved are the liquid upper stage, the vehicle Equipment Bay and the payload interfaces which are re-engineered to accommodate specific demands of each launch mission.

This paper traces the evolution of Indian PSLV from developmental flights to current operational status and highlights the features which make it a versatile launcher to undertake varied and complex missions. Specific challenges faced and strategies adopted in performing some typical missions are outlined.