

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Advancements in Materials Applications and Rapid Prototyping (9)

Author: Mr. Anatoly Karpov
Air Launch Aerospace Corporation, Russian Federation, airlaunch@airlaunch.ru

Dr. Vladimir Degtyar
SRC Makeyev, Russian Federation, src@makeyev.ru
Dr. Sergey Teselkin
Air Launch Aerospace Corporation, Russian Federation, airlaunch@airlaunch.ru
Mr. Oleg Sokolov
Air Launch Aerospace Corporation, Russian Federation, sokolov@airlaunch.ru

FEATURES OF LAUNCH VEHICLE/PAYLOAD INTERFACE IN LAUNCH SYSTEMS WITH A
TAKE-OFF IN A HORIZONTAL POSITION ON THE EXAMPLE OF THE "AIR LAUNCH" SPACE
TRANSPORTATION SYSTEM

Abstract

Satellite manufactures today are used to conventional vertical take-off launch systems. Their spacecrafts are designed to withstand a similar set of loads induced by the different launch vehicles only varying in magnitude. Also the design approaches and verification means are adopted to the loads induced by vertical take-off launch systems.

Horizontal take-off launch systems induce new load cases that have to be looked at separately. In the case of AirLaunch much effort was spent to limit the magnitude of these additional load cases to ease AirLaunch's introduction on the market. The general approach was to either eliminate or limit additional load cases to a magnitude not critical for existing satellite designs in order to enable a maximum number of potential payload customers rather than limiting them to specifically designed or adapted spacecrafts. Ideally a customer should be able to switch from vertical to horizontal take-off launch system without additional design effort due to additional load cases.

AirLaunch's load cases are presented and compared to conventional launch systems. The additional load cases are explained and their impact to satellite design is analysed. Finally, it is shown that AirLaunch's load cases do not require significant additional effort in the design process nor in the dimensioning of the spacecraft.