

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Space Transportation Solutions for Deep Space Missions (8-A5.4)

Author: Ms. SeokHee Lim

Korea Aerospace Research Institute (KARI), Korea, Republic of, shlim@kari.re.kr

Dr. Daeban Seo

Korea Aerospace Research Institute (KARI), Korea, Republic of, seodb@kari.re.kr

Dr. Keejoo Lee

Korea Aerospace Research Institute (KARI), Korea, Republic of, klee@kari.re.kr

Dr. Junseong Lee

Korea Aerospace Research Institute (KARI), Korea, Republic of, jsl@kari.re.kr

Dr. Jaesung Park

Korean Aerospace Research Institute, Korea, Republic of, cronus@kari.re.kr

Dr. Cheulwoong Kim

Korea Aerospace Research Institute (KARI), Korea, Republic of, kimcw@kari.re.kr

Dr. Keum-Oh Lee

Korea Aerospace Research Institute (KARI), Korea, Republic of, kol@kari.re.kr

Mr. Byoungjik Lim

Korea Aerospace Research Institute (KARI), Korea, Republic of, tachyon@kari.re.kr

Dr. Sung-Hyuck Im

Korea Aerospace Research Institute (KARI), Korea, Republic of, ish@kari.re.kr

Mr. Sang Hyun Choi

Korean Aerospace Research Institute, Korea, Republic of, shchoi@kari.re.kr

VALUE PROPOSITIONS OF SMALL SPACECRAFT-DEDICATED LAUNCH VEHICLE FOR
FUTURE SPACE MISSIONS IN KOREA

Abstract

Launch Vehicles transport spacecraft and astronauts into a target orbit and deliver crew supply systems to the International Space Station. As we stride to stay in space and on the moon for longer period, often symbolized by the NASA Artemis program, we must be able to quickly adopt innovative solutions that non-space companies can offer in the area of safety and logistics. Demand for In-Orbit Demonstration (IOD) of these non-space solutions will continue to increase as new space items and technologies have been identified. In Korea, a space program to develop preceding technologies and parts to technical readiness level of seven prior to the main system development program is being established. The key values of small spacecraft-dedicated launcher, namely in low cost and high frequency, can expedite the design and function verification process in a significant manner, contributing to establishing space ecosystem.

A booster-stage engine test vehicle of Korea Space Launch Vehicle-II was flight-proven in 2018. Cost-reduction technology development as well as deep space mission planing for smallsat-launch vehicle capable of placing 500 kg into 500 km Sun-Synchronous Orbit are being conducted. Our preliminary feasibility study indicates that an additional kickstage enables longer and deeper space mission to the Moon. For example, one potential configuration can transport less than 50 kg to low lunar orbit and 100 kg to Near Rectilinear Halo Orbit (NRHO), which takes around 100 days.