IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Launch Services, Missions, Operations, and Facilities (2)

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RESEARCH ON TECHNOLOGICAL DEVELOPMENT STRATEGY OF CHINA'S SEA LAUNCH SUPPORT SERVICE

Abstract

With rapid economic developments, important infrastructures are continuously increasing in all China's land regions. It is more difficult to choose land launch regions, flight area and substage falling areas for space launch missions. However, the sea launch can solve the choosing safety problems because of sea launch platform having navigation on sea. For the increase of low-inclination launch missions, the sea launch support platform (SLSP) can sail to low-latitude waters. It also can effectively improve the carrying capacity of launch vehicles in low-inclination launch missions. SLSP is adaptable to launching requirements for any type of orbit.

In order to quickly form a sea launch service capability, we propose a three-stage technological development strategy. The sea launch technologies include the selection and development of launch vehicles, SLSP, launch process, launch command, wharf and support facilities. Three-stage are divided by solid launch vehicle, small liquid launch vehicle, and medium to large liquid launch vehicle. The adaptive improvement of launch vehicles and the technologies of launch stability control need to be studied. In the first two stages, existing transport ships can be transformed into SLSP. The different SLSP technical requirements are proposed for the clod and hot launch modes of solid launch vehicles and for liquid launch vehicles. Three kinds of flexible intelligent platforms are realized to adapt to different types of launch vehicles. "Three-horizon" mode is adopted to the process of test and launch. In the first stage, testing and docking with launch vehicles and satellites, mounting fairing, etc. are operated in the wharf. Then the whole launch vehicle is loaded on board. In the second and the third stage, launch vehicles and satellites are operated in the SLSP cabin room. After SLSP arrives in the designated sea area, the launch vehicle is upright as whole, loaded propellant, replenished propellant before launching, and launched by means of remote wireless control. Based on space TTC and relay transmission, existing China's "Yuanwang" ship can be transformed into command and control platform for testing and launching, evacuation support for crew on SLSP, and measurement and control on launching area. Simplifying the wharf support facilities is conducive to selecting multiple coastal ports for berthing SLSP according to the mission area and improving the launch efficiency. In 2019, China successfully launched the first CZ-11 carried seven

satellites on the China Yellow Sea. Sea launch can enhance the launch flexibility and mission adaptability of China's launch missions.