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LEADING PROGRESS OF CHEMICAL ROCKET ENGINES IN CHINA

Abstract

Chemical Rocket Engines(CREs) have been playing very important roles last century in China, and new CREs will be developed and used extensively in this century. After reviewing briefly achievements made by China Academy of Launch Vehicle Technology affiliated by China Aerospace Science and Technology Corporation(CASC) in leading development of CREs, this paper focuses on future objective, technique routes and challenges of new CREs in perspective of aerospace system engineering and effective development and transfer of aerospace technology. Here, traditional CREs are those CREs using environment-unfriendly conventional propellants and LH2/LOX as propellants, which were firstly appeared in Long March launch vehicles and Advanced Upper Stages(AUSs). Traditional CREs make early launch of earth satellites, moon detectors and manned spaceships come true, constituting base stones of China launch vehicles, and satisfying multiple requirements of diversified earth orbits, low cost , high reliability, and high-density launch of satellites formation. Chinese aerospace researchers and workers have been not satisfied with poisonous propellants for a long time, resulting in fast development of new environment-friendly CREs. High thrust LOX/Kerosene engines get first application in new generation of Long March, H2O2/Kerosene engines are studied seriously in application of AUSs, H2O2/HTPB hybrid engines exploration are supported in universities, LOX/Methane engines for future space exploitation are expected and tested. All of these new CREs overcome certain shortcomings of traditional CREs and direct many chances of future energy exploitation and applications. Many elements weighing new CREs are such as performance, environment-friend, simple operation, storability, and other special characteristics of propellants, two parallel driving forces are explicit including system engineering and effective development of available technology. At first, choice of propellants need trade study of those elements, theoretical and analytical results direct exploration of propellants in turn, secondly, effective development correlates highly with low cost launch technology, also resulting in great upcoming of military-civil technology amalgamation in China. Recovery of launch vehicles made by SpaceX challenges aerospace of China and all over the world, and shall speed up upcoming of our new aerospace age. Today, a new era of development of China launch vehicles is coming, and CASC shall continue playing main and leading roles, we also welcome corporation and participation of local government and state, academic institution, civil organization, privates and etc.