
Design features of lifting body aircraft

V.E. Minenko¹, A.N. Semenenko¹, E.N. Shilyaeva²

¹ Bauman Moscow State Technical University, Moscow, 105005, Russia

² JSC “CROC, Inc.”, Moscow, 111033, Russia

The article discusses several notable projects of «lifting body» type landers, developed both in our country and abroad. A comparative analysis of the key design characteristics of vehicles was performed and examined their possible usage in future space programs for both unmanned and manned spacecrafts, the orbital destination spacecraft and lunar missions programs. The general requirements for equipment, structure and thermal protection of landers are described. We considered the mass characteristics of re-entry vehicles, depending on the purpose of the landing vehicle, dimensions and aerodynamic form. Layout diagrams for some lander types are presented. The comparison analyses of design features are provided for «lifting body» type and «rolling» type «Union» or «Apollo» vehicles. In the article also considered the problem of safe landing of «lifting body» type landers and given thoughts about the usefulness of alternative landing ways. It is noted that implementation of rotary or turbojet planting systems will allow developing a set of landers such as orbital, lunar or Mars Expeditionary Complex, where the problem of minimizing of mass characteristics is emphasized. The results of «lifting body» type landers research project can be used by students in the preparation course and diploma projects.

Keywords: *lifting body aircraft, landing systems and aids, lift-to-drag ratio, hyperbolic range of speed, glide descent.*

Minenko V.E. graduated from Bauman Moscow Higher Technical School in 1956. Dr. Sci. (Eng.), Professor of the Spacecrafts and Launch Vehicles Department of Bauman Moscow State Technical University. Author of 120 scientific works in the field of designing of aerospace round-trip bodies. e-mail: departm1@sm.bstu.ru

Semenenko A.N. graduated from Bauman Moscow Higher Technical School in 1957. Ph.D., Professor of the Spacecrafts and Launch Vehicles Department of Bauman Moscow State Technical University. Author of ten publications on casing durability. e-mail: departm1@sm.bstu.ru

Shilyaeva E.N. graduated from Bauman Moscow State Technical University in 2013. An engineer of JSC “CROC, Inc.” Coauthor of two publications in the field of spacecraft design. e-mail: k.veter@list.ru
