

Sensitivity analysis of the economic model of life cycle costs of a reusable air start system

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In the coming years, a number of companies (for example, SpaceX) are planning to launch several thousand small satellites to provide high-speed Internet access anywhere in the world. As a result, the demand for air launch systems with a payload of 300...500 kg will increase. An economic model of the cost of the air start system life cycle allowing choosing the parameters of the system that ensure its payback was developed. Simulation of the cost of launching carrier rockets (CR) Minotaur and Pegasus-XL (air launch) showed that the air launch system can reduce the carrier rocket launch cost by approximately 40%. The sensitivity analysis of the model showed that the model is insensitive to most of the initial data. The model showed high sensitivity to the speed (percentage) of the learning curve for the production of CR and the average for the cost of manufacturing the first CR. The influence of these initial data on the change in air start costs and the return on investment project was investigated.

Keywords: *air launch, carrier rocket, cost reduction, investment analysis methods, reuse, production quantity, learning curve, economic model sensitivity*

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