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DEVELOPMENT OF A SUBORBITAL INEXPENSIVE ROCKET FOR AFFORDABLE SPACE ACCESS

Abstract

The Suborbital Inexpensive Rocket (SIR) is a new suborbital launch vehicle currently under development with an expected maiden flight in 2019. Powered by a hybrid rocket engine working on green eco-friendly propellants (Paraffin/N2O), SIR has the capability to carry scientific payloads up to 75 kilograms to an altitude of 200 kilometres and recover them back. Following a very precise actively controlled guided flight, SIR is intended to deliver its payload to the desired precise altitude and use its recovery system to land back softly and safely in an autonomously controlled manner allowing the rocket to be fully reused lowering the costs of manufacturing, operation and recovery.

With a launch manifest of two flights per month SIR will provide a solution for a problem that is affecting the space market which is underserved by all current active suborbital rockets which are dedicated for higher altitudes and with expensive prices. As a cost-effective launch vehicle SIR is expected to offer its service with 4 times cheaper prices than the cheapest in market. This will echo by filling the gap in the suborbital launches market allowing exoatmospheric astronomical research, weather monitoring and short duration microgravity research experiments.This will encourage the engagement of more entities to the field of space research and exploration.

The flight profiles, mission design, payload handling conditions, general designs, analysis and proposed operations are discussed in this paper with the upcoming steps and future work. The procedure meant to be taken in the upcoming project stages to make it user friendly and closer to the customer and ease adjusting the vehicle to their experiemnt's needs are briefly introduced.