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Author: Ms. Sara Altrawneh
Jordan University of Science & Technology, Jordan, saratrawneh1@gmail.com

OPTIMIZING REUSABLE ROCKET PERFORMANCE: HARNESSING THE POTENTIAL OF GRID
FINS FOR ENHANCED CONTROL

Abstract

This study aims to investigate the control mechanism of grid fins in reusable rockets, with a focus on SpaceX's utilization of this technology. It describes their construction, operation, and significance for directing and controlling rockets throughout their descent and landing. The operational challenges and reliability of grid fin deployment are examined, and the importance of flight testing for validation is emphasized. The paper also highlights how reusable rockets, such as SpaceX's Falcon 9, will transform space travel and explains the concept of them. Because they recover and reuse rocket parts, reusable rockets offer an economical and sustainable way to reach space. Using this method, the research improves our understanding of spaceflight control systems and maximizes the efficiency of reusable launch vehicles.