

# SUSTAINABLE LAUNCH AND LANDING SITES

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**Abstract:** In recent years, sustainability and sustainable development have had an increasing influence on modern life (e.g. laws, movements, life style, etc.). These changes have also affected the technological development of new products within the space industry. For example, reusable rockets, rocket stages, or engines using eco-friendly propellants are under development, or have already been implemented. However, not only the end products need to be sustainable and eco-friendly, Production, implementation, commissioning, and in-service use cases need to be eco-friendly and resource conservative.

It is therefore necessary for launch and landing sites to be sustainable and “green”. That means, both environmental and technical requirements need to be fulfilled. The purpose therefore is to investigate the requirements and elaborate the concepts and ideas that can fulfill these requirements and use cases.

Hence, the approach is:

1. to review existing spaceports
2. to review implemented and planned initiatives for greener spaceports
3. to define use cases (e.g. launch and landing)
4. to elaborate high level requirements (HLR)
5. to develop concepts and ideas for sustainable and eco-friendly launch and landing sites.

The focus of this paper is not only on new launch and landing sites, yet to be built, but also on existing launch. After concept definition, assessments and trade-offs are performed to identify the most suitable and promising concepts and ideas, depending on the use cases and requirements. Additional points for the assessments and trade-offs include, but are not limited to, cost aspects, schedule, and development effort.

The results of these assessments and trade-offs have identified the potential for eco-friendly existing and future landing sites and proposed methods to implement these concept and ideas on existing and future spaceports.