

# Lunar Lander Propulsion System Market - A Global and Regional Analysis: Focus on Subsystem and Country Analysis - Analysis and Forecast, 2025-2040

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## Abstracts

This report can be delivered within 1 working day.

### Introduction of Lunar Lander Propulsion System Market

The lunar lander propulsion system market encompasses a variety of propulsion technologies, including chemical thrusters, electric propulsion, and hybrid systems, which are crucial for precise lunar landing and maneuvering operations. This market has been driven by the increasing demand for efficient and reliable propulsion systems to support upcoming lunar exploration missions and sustained human presence on the Moon. Innovations in propulsion technologies, such as advanced fuel formulations and lightweight propulsion components, address the growing need for higher performance and longer mission durations. The lunar lander propulsion system market is competitive, with key players such as L3Harris Technologies, Northrop Grumman, Moog Inc., and Lockheed Martin leading technological advancements. Furthermore, rising investments from space agencies and private enterprises to accelerate lunar exploration programs influence market dynamics. Consequently, the lunar lander propulsion system market continues to develop rapidly to meet the technical challenges associated with lunar missions.

### Market Introduction

The lunar lander propulsion system market plays a vital role in enabling safe and precise lunar landing and surface operations. With the increasing interest in lunar exploration and the goal of establishing a sustainable human presence on the Moon, the market has experienced substantial growth. Advanced propulsion technologies,

including chemical thrusters and electric propulsion systems, are being increasingly adopted to improve efficiency, reliability, and mission flexibility. These innovations help optimize fuel consumption and enhance maneuverability, driving the expansion of the lunar lander propulsion system market. Furthermore, growing investments by government space agencies and private companies in lunar missions contribute to market development. As a result, key stakeholders have been focusing on developing robust propulsion solutions to support complex lunar missions and ensure mission success.

### Industrial Impact

The lunar lander propulsion system market has been experiencing steady growth driven by the rising demand for reliable and efficient propulsion technologies critical to lunar exploration missions. Lunar lander propulsion systems ensure precise landing, maneuvering, and safe operations on the lunar surface. The market is advancing rapidly due to innovations in propulsion technologies such as chemical thrusters, electric propulsion, and hybrid systems. These technological advancements enable improved fuel efficiency, higher thrust-to-weight ratios, and enhanced mission flexibility compared to conventional propulsion methods.

Additionally, increasing investments from government space agencies and private aerospace companies accelerate the development and adoption of lunar lander propulsion system solutions worldwide. As lunar missions become more frequent and complex, the lunar lander propulsion system market is expected to grow substantially, driving progress in space exploration and related industries.

### Market Segmentation:

#### Segmentation 1: By Subsystem

##### Chemical Thruster

Propellant Tank

Pump

Fuel Oxidizer and Valve

##### Electric Thruster

Propellant Tank

Pump

Cold gas Thruster

Gas/Storage Tank

Pump

Propulsion Chamber/Nozzle

Hybrid Thruster

Propellant Tank

Pump

Propulsion Chamber/Nozzle

### Chemical Thruster to Dominate the Lunar Lander Propulsion System Market (by Subsystem)

The lunar lander propulsion system market, by subsystem, is predominantly driven by chemical thrusters. The chemical thrusters segment was valued at \$61.5 million in 2024 and is projected to reach \$71.5 million by 2040, reflecting steady growth. This segment's strong position is due to the critical role that chemical thrusters play in providing reliable and high-thrust propulsion necessary for precise lunar landing and maneuvering. Furthermore, increasing investments in lunar exploration programs, stringent performance requirements for lunar missions, and continuous advancements in chemical propulsion technology specifically designed for lunar landers contribute to the expansion of this segment. These factors combined highlight why chemical thrusters are expected to dominate the lunar lander propulsion system market over the forecast period.

### Segmentation 2 : by Region

North America

Europe

Asia-Pacific

Rest-of-the-World

## Recent Developments in the Lunar Lander Propulsion System Market

ITAR restrictions have prompted regions such as Europe and India to invest in indigenous lunar lander propulsion system technologies, fostering a more diverse supplier base by 2040.

The 2020s mark a renaissance for chemical thrusters in the lunar lander propulsion system market, integrating decades of flight heritage with modern innovations to meet precision and safety requirements.

In 2024, the U.S. State and Commerce Departments updated export control rules to ease licensing for allied cooperation, affecting companies such as SpaceX, Blue Origin, and Astrobotic, which must ensure compliance while developing lunar lander propulsion systems.

The cautious relaxation of U.S. regulations aims to support industry growth and Artemis international partnerships while core propulsion technologies remain tightly controlled for national security.

Astrobotic's Peregrine Mission 1, funded by NASA in 2019 and launched in 2024, is the first Artemis Commercial Lunar Payload Services (CLPS) delivery, using five 667 N main thrusters from Frontier Aerospace to demonstrate precision landing capabilities.

In December 2022, Japan's ISPACE successfully delivered the U.A.E.'s Rashid rover to the Moon aboard the Hakuto-R lander, utilizing its onboard engines for lunar orbit insertion and controlled descent, highlighting commercial lunar delivery advances in the lunar lander propulsion system market.

How can this report add value to an organization?

**Product/Innovation Strategy:** The product segment helps the reader understand the different types of services available globally. Moreover, the study provides the reader with a detailed understanding of the lunar lander propulsion system market by products based on subsystems.

**Growth/Marketing Strategy:** The lunar lander propulsion system market has seen major development by key players operating in the market, such as business expansion, partnership, collaboration, and joint venture. The favored strategy for the companies has been synergistic activities to strengthen their position in the lunar lander propulsion system market.

**Methodology:** The research methodology design adopted for this specific study includes a mix of data collected from primary and secondary data sources. Both primary resources (key players, market leaders, and in-house experts) and secondary research (a host of paid and unpaid databases), along with analytical tools, have been employed to build the predictive and forecast models.

Data and validation have been taken into consideration from both primary sources as well as secondary sources.

#### Key Considerations and Assumptions in Market Engineering and Validation

Detailed secondary research has been done to ensure maximum coverage of manufacturers/suppliers operational in a country.

To a certain extent, exact revenue information has been extracted for each company from secondary sources and databases. Revenues specific to product/service/technology were then estimated based on fact-based proxy indicators as well as primary inputs.

The average selling price (ASP) has been calculated using the weighted average method based on the classification.

The currency conversion rate has been taken from the historical exchange rate of Oanda and/or other relevant websites.

Any economic downturn in the future has not been taken into consideration for

the market estimation and forecast.

The base currency considered for the market analysis is US\$. Considering the average conversion rate for that particular year, currencies other than the US\$ have been converted to the US\$ for all statistical calculations.

The term “product” in this document may refer to “service” or “technology” as and where relevant.

The term “manufacturers/suppliers” may refer to “service providers” or “technology providers” as and where relevant.

## Primary Research

The primary sources involve industry experts from the lunar lander propulsion system industry, including lunar lander propulsion system product providers. Respondents such as CEOs, vice presidents, marketing directors, and technology and innovation directors have been interviewed to obtain and verify both qualitative and quantitative aspects of this research study.

## Secondary Research

This study involves the usage of extensive secondary research, company websites, directories, and annual reports. It also makes use of databases, such as Businessweek and others, to collect effective and useful information for a market-oriented, technical, commercial, and extensive study of the global market. In addition to the data sources, the study has been undertaken with the help of other data sources and websites.

Secondary research was done to obtain critical information about the industry’s value chain, the market’s monetary chain, revenue models, the total pool of key players, and the current and potential use cases and applications.

## Key Market Players and Competition Synopsis

The lunar lander propulsion system market has been characterized by the presence of prominent companies driving technological innovation and market growth. Leading firms such as L3Harris Technologies, Inc., Northrop Grumman, Moog Inc., and Lockheed Martin offer advanced propulsion solutions tailored for lunar lander applications. These

key players focus on enhancing propulsion efficiency, reliability, and safety to support lunar exploration missions. The competition in the lunar lander propulsion system market is robust, with companies investing substantially in research and development to deliver cutting-edge propulsion technologies. The market dynamics have been further shaped by continuous improvements in propulsion design and materials, enabling better performance in the challenging lunar environment. As the demand for lunar missions increases, companies are expanding their portfolios and global outreach to secure contracts with space agencies and private enterprises. The ongoing advancements in propulsion technologies are expected to intensify competition and foster innovation in the lunar lander propulsion system market.

Some prominent names established in this market are:

Ariane Group

SpaceX

Blue Origin

Dynetics (Leidos)

Lockheed Martin

Northrop Grumman

Astrobotic

Intuitive Machines

Firefly Aerospace

Draper Laboratory

ISPACE, Inc.

Frontier Aerospace

Agile Space Industries

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