

TECH SCAN

SPACE LAUNCHING VEHICLES



Space launching vehicles (SLV) are the main characters in the amazing journey of space exploration, propelling our dreams into the cosmic unknown. SLVs are formidable space taxis, intended to transport satellites, research instruments, and even humans into space. With their ability to breach Earth's atmosphere, these vehicles serve as a platform for the sharing of cutting-edge knowledge and advancements in space research.

The patents associated with advances in structural design, propulsion, guidance systems, and other areas are the core of SLV's technological progress. Space launch technologies foster collaboration, which is a tribute to our shared search for understanding that surpasses national boundaries and into the infinite cosmos in an era where the global pursuit of space exploration expedites.



INNOVATION TIMELINE



- 1957 R-7 Semyorka (Soviet Union), the Sputnik I Launcher
- 1961 Red Stone Rocket was Launched
- 1969 Saturn V (USA), the Apollo II Launcher
- 1981 Reusable Orbiter on Space Shuttle (USA)
- 2002 SpaceX's Falcon I, Liquid-fuelled Rocket to Reach Orbit
- 2010 SpaceX's Falcon 9, with Partially Reusable First Stage
- 2015 Blue Origin Successfully Test-fired its BE-3 Engine
- 2017 ISRO Launched 104 Satellites Through PSLV C37
- 2018 Falcon Heavy (SpaceX), the Most Powerful Operational Rocket
- 2020 China's Long March 5B played a Crucial Role in Launching Modules
- 2021 Blue Origin's New Shepard Completed its first Crewed Suborbital Flight
- 2023 SpaceX's Starship Fully Reusable Space flight and Firefly Aerospace's Alpha's Cost Effective Satellite Launcher

PATENTABLE COMPONENTS

Space Launching Vehicles have several components that can be eligible for patent protection. The following domains are frequently assessed for patentability:

SPACE LAUNCHING VEHICLES

- Launch Vehicle System
- Launch Vehicle Procedure
- Multiple Spacecraft Launch System

CONTROL SYSTEM

- Unique Algorithms
- Software and Hardware Component
- Control During Launch

PROPULSION SYSTEM

- Electrochemical Propulsion
- Solid/Liquid Propulsion
- On-orbit Spacecraft Propulsion
- Cross-feeding Propellants

SPACE LAUNCHING METHOD

- Electromagnetic Pushing
- Electro-antimagnetic Launch Method
- Vertical Take-Off and Landing
- Automatic Pitch and Yaw Response

STRUCTURAL DESIGN AND MATERIALS

- Lightweight Materials
- Composite Structures
- 3D Printing Technology

SAFETY SYSTEMS

- Emergency Abort System
- Fail-Safe Mechanisms

BOOSTER SYSTEM

- Core Boosters
- Patchy Boosters-separable

ADAPTOR SYSTEM

- Adaptor Assemblies for Deploying Small Satellites

STAGE SEPARATION MECHANISMS

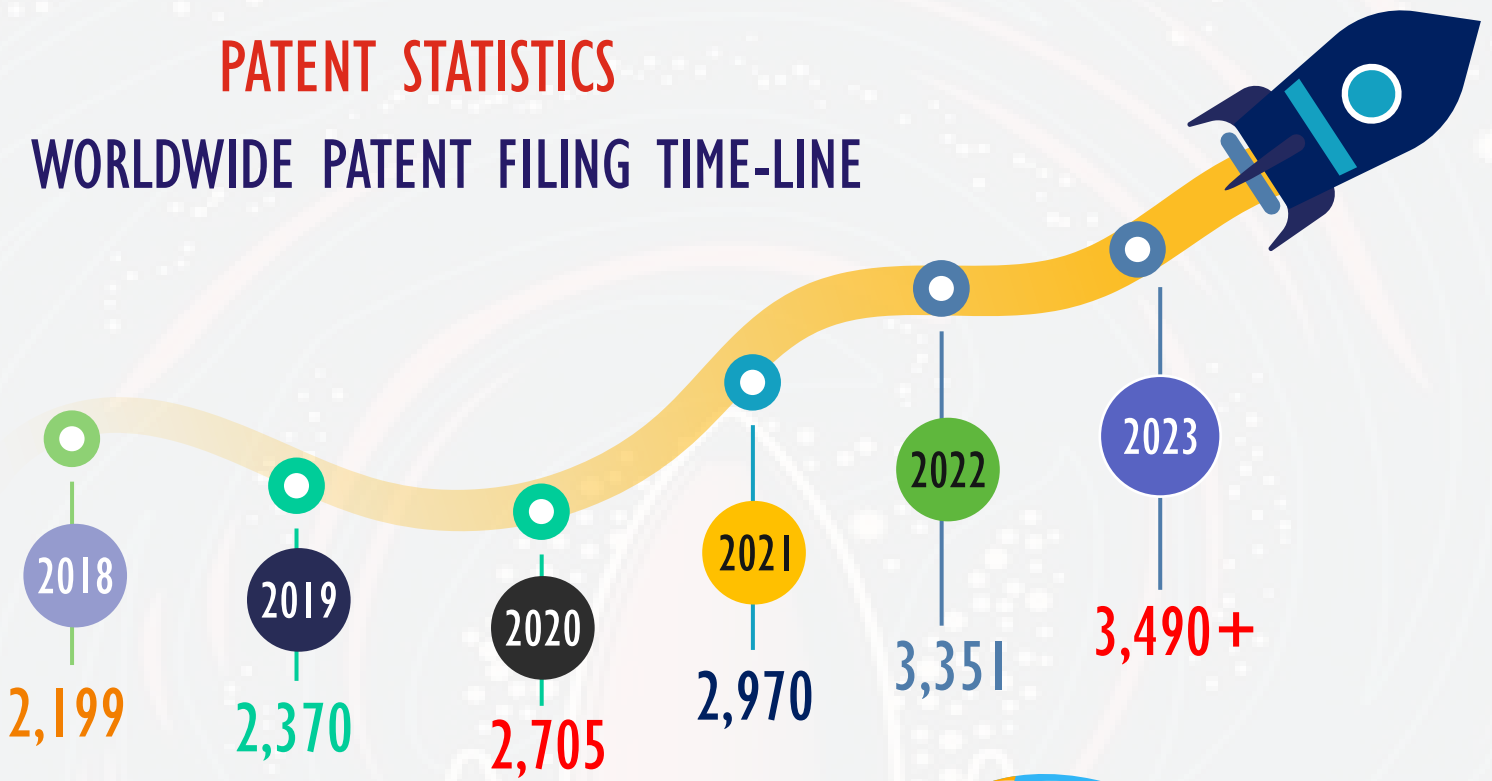
- Separation Mechanisms
- Autonomous Separating System
- Multistage Release System

REUSABILITY TECHNOLOGY

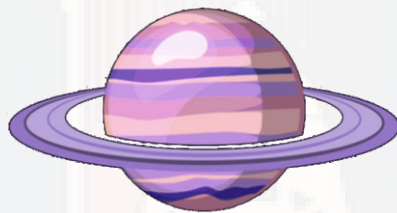
- Landing Systems
- Recovery Mechanisms
- Refurbishment Processes

PATENT STATISTICS

WORLDWIDE PATENT FILING TIME-LINE



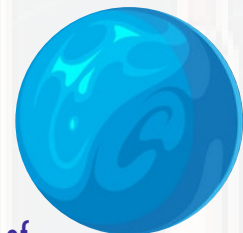
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Nvidia Co



794
Intel Co

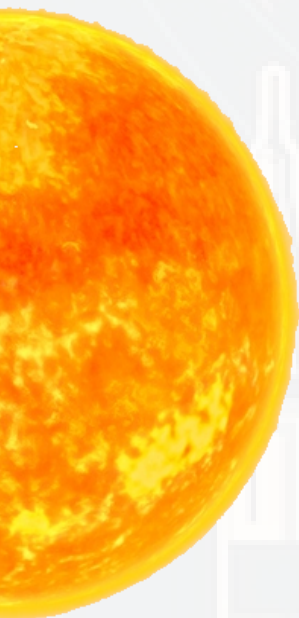


577
Lg Electronics Inc



449
China Academy of
Launch Vehicle Tech

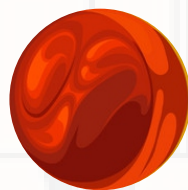
372
Apple Inc



TOP APPLICANTS



127
Raytheon Company



194
The Boeing Company

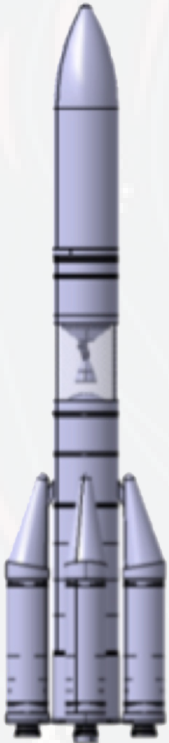


328
Beijing Institute of
Space Launch Tech

13540
United States
of America



1230
European
Patent Office



925
China



536
India



308
Australia



193
United
Kingdom



102
Canada



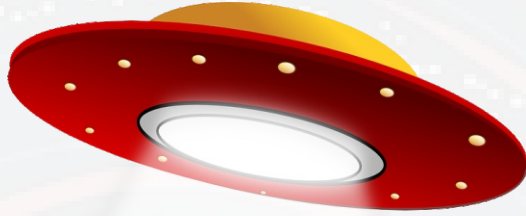
58
Russian
Federation



33
Singapore



PATENT LANDSCAPE



Database: WIPO PATENTSCOPE

NOTABLE INNOVATIONS

Patent Application	Priority Date	Title	Assignee
US20230365279	May 12, 2022	Stacked Spacecraft Launch and Orbit Raising	Maxar Space LLC
EP4257817	Apr 5, 2022	Liquid Propellant Supply Assembly for a Rocket Engine	Finis Terrae S R L
WO2023177228	Mar 17, 2022	Electrical Umbilical System for Space Launch Vehicle, using Electromagnet	Innospace Co Ltd
US11518547	July 18, 2021	Booster System for Launch Vehicle	ATSpace Pty Ltd
US20230012410	Jul 7, 2021	Stud-Propelling Mechanisms for securing a Launch Vehicle to a Landing Platform, and Associated Systems and Methods	Blue Origin LLC
AU2021100758	Feb 8, 2021	ZENIT-AUSTRALIA Space Launch Vehicle	Cosmovision Global Corporation Pty Ltd
US20220227502	Jan 7, 2021	Systems, Methods, and Devices for Launching Space Vehicles using Magnetic Levitation, Linear Acceleration Thermal Energy Scavenging, and Water Steam Rockets	Freedman Jared Allan
US20220127019	Oct 23, 2020	Rocket Propulsion System, Method, and Spacecraft	ArianeGroup GmbH
CN110406698	July 24, 2019	Space Launch System and Method based on Electromagnetic Pushing	Naval Univ of Engineering
CA3060150	Feb 22, 2019	Systems and Methods for Launching a Plurality of Spacecraft	The Boeing Company, Illinois
WO2020065660	Sep 24 2018	A System and Method for Launching Multiple Satellites from a Launch Vehicle	Indian Space Research Organisation

WHITESPACE



Advanced Propulsion System



Flow Forming Techniques, Reduce Weld Seams and Improves Manufacturing Efficiency



Nuclear Thermal Propulsion/Advanced Electrical Propulsion



3D-Printed Combustion Chamber Design



AI Tools for Improved Navigation and Reduced Response Time of Launchers



Environmentally Friendly Propellants



Fully Reusable Launch Systems



Expander-cycle Technology Integrated Demonstrator for Cryogenic Upper Stage Engines



Carbon Based Alternatives of Aluminium Materials



High Strength Materials-Aluminium Alloy and Polymer



In-Orbit Refuelling



Innovative Structural Design of Launcher



Automation, Ruggedized Avionics Assemblies for Kinetic Launch



Airborne Sensor for Fugitive Emissions



Precision Pointing Interface



Modular Configuration of Launch Vehicle System



Inflatable Bladder Fairing Recovery System with Repositioning Mechanisms and Method



Aerospike Engines



Locking Device for Grid Rudder of Space Launch Vehicle

If you would like to learn more about any of these areas or have specific questions, we're here to provide further information and insights. Our team is dedicated to driving progress and staying at the forefront of Space Launching Vehicles Technology.

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