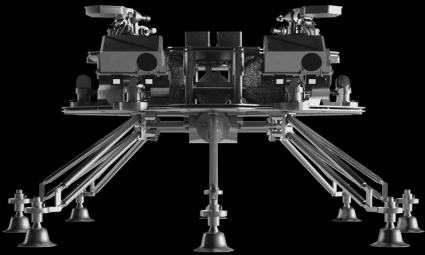# softserve

SOFTSERVE'S LUNAR EXPLORATION DRONE

EXPLORE | IDENTIFY | NAVIGATE

SoftServe's **Lunar Exploration Drone** simulation is designed to demonstrate how companies can explore the Moon in search of valuable resources. Our navigation and control software demonstrates how an advanced drone propelled by rocket thrusters overcomes the challenges of harsh lunar conditions and autonomously explores, maps, and analyzes the lunar surface to find ice deposits.

CHALLENGES

Accessing the Moon's ice deposits is difficult due to their location in shadowy polar craters and caves. Traditional robots struggle in these areas, complicating space missions. One of the main challenges is developing a solution to identify and map these resources:

Hostile Environment
The hostile lunar environment challenges machinery endurance and operational stability.
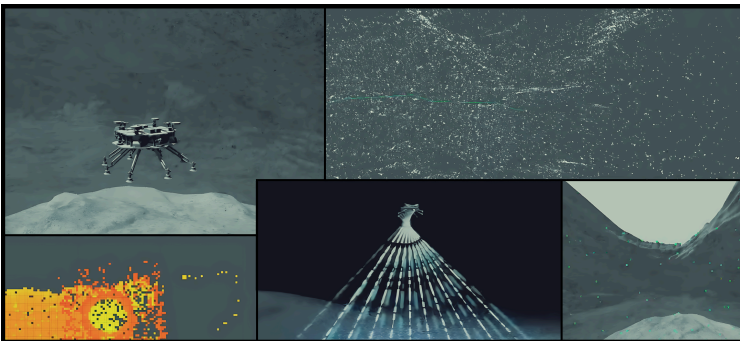
Autonomous Operation
Operation and navigation without human guidance require highly reliable autonomous systems.

Sustainable Exploration
Efficient detection and analysis of ice and other resources are required for sustainable lunar missions.

SOLUTION

The **Lunar Exploration Drone** simulation and flight software leverage SoftServe's expertise in enabling autonomous and seamless lunar operations. It enhances exploration, mapping, and mission support by utilizing:

- Simulation-first development approach
- Moon-like co-simulation environment
- Simulation-based solution validation layer
- Software-in-the-loop testing robotics guidance, navigation, and control (GNC)
- Robotic AI, perception, and SLAM algorithms

BENEFITS

Sustainable Exploration
Simulations and rapid prototyping accelerate drone development and lunar resource extraction required for long-term Moon operations.

Ready-to-Use Simulation
Reduction of risk and development costs through photorealistic, physics-based, and customizable simulation of lunar environment.

Advanced Perception and GNC Algorithms
Create detailed 3D maps of previously inaccessible areas and identify lunar resources.

TECH STACK

- **Robotic perception** and **SLAM algorithms** provide highly detailed 3D lunar surface maps.
- **Robotic GNC algorithms** can control thrusters in a safe and fuel-efficient manner.
- **ROS 2** supplies middleware for drone software.
- **NVIDIA Isaac Sim**™ supports the development, verification, and validation of the system.

COMPONENTS

SoftServe's Moon-Like environment: This can be used to test various and complex edge cases.

Advanced 3D mapping: Using advanced technology, the drone generates 3D maps for efficient resource allocation.

Navigation system: Capable of maneuvering through deep craters and complex cave systems, enabling access to previously inaccessible lunar resources.

Multi-purpose utility: The technology can be adapted for terrestrial applications, showcasing versatility and expanding its value beyond lunar exploration.

BUSINESS VALUE

COST REDUCTIONS

Reduce mission planning and operating costs with simulation-based digital twin technologies for lunar mining robotics.

FUTURE-READY SOLUTIONS

Accelerate your organization's entry into commercial lunar activities with advanced simulation tools, preparing for the next era of space exploration.

TERRESTRIAL INDUSTRY APPLICATIONS

Adapt the space solutions, such as simulation and software development, to Earth industries like mining, construction, and more.

SUSTAINABLE OPERATIONS

Accelerate drone development and lunar resource extraction required for long-term Moon operations.

ACCELERATE TIME-TO-MARKET

Speed up time-to-market with our pre-built accelerators.

MISSION SAFETY

Increased mission safety due to the ability to simulate edge cases.

PARTNERS

Astroport

BruhnBruhn Innovation

NVIDIA.

WHY SOFTSERVE

STABILITY	EXPERTISE	EXPERIENCE	TRUST
31 YEARS	**30%**	**20+ YEARS**	**14 YEARS**
Award-winning service, across multiple industries	of the team are Sc.D. & Ph.D. holders in robotics & advanced automation	Our team's total experience in space projects	Longest space mission with our experts involved

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