SOFTSERVE'S LUNAR EXPLORATION DRONE



EXPLORE | IDENTIFY | NAVIGATE

Meet L-REX, SoftServe's simulation of a lunar robotic excavator developed to expedite lunar resource extraction. The L-REX simulation provides a comprehensive virtual environment to test and optimize excavation techniques for frozen, oxygen-rich regolith. By simulating the challenges of the Moon's environment, L-REX supports the long-term goals of establishing a lunar base and advancing space exploration.

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.



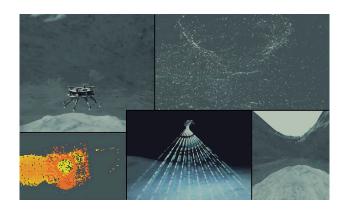
Sustainable Exploration

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

SOLUTION

The Lunar Exploration Drone simulation and flight software leverages SoftServe's expertise in enabling autonomous and seamless lunar operations:

- 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.

KEY FUNCTIONALITY



SoftServe's simulation of the lunar surface: 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.



Dynamic navigation: 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.

SUSTAINABLE OPERATIONS

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

FUTURE-READY SOLUTIONS

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

MISSION SAFETY

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

TERRESTRIAL INDUSTRY APPLICATIONS

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

ACCELERATE TIME-TO-MARKET

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









WHY SOFTSERVE

STABILITY

31 YEARS

Award-winning service, across multiple industries

EXPERTISE

Sc.D. & Ph.D.

30% of the team are Sc.D. & Ph.D. holders in robotics & advanced automation EXPERIENCE 20+ YEARS

Our team's total experience in space projects

TRUST

14 YEARS

Longest space mission with our experts involved

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