# Dossier: PIONEER ASTRONAUTICS

## SBIR Award Details

**Award Title:** N/A

**Amount:** $1,718,730.00

**Award Date:** 2023-03-10

**Branch:** MDA

## AI-Generated Intelligence Summary

**Company Overview:**

Pioneer Astronautics is a space technology company focused on developing innovative solutions for in-situ resource utilization (ISRU), advanced space propulsion, and closed-loop life support systems to enable sustainable human space exploration and settlement. Their mission is to drastically reduce the cost and increase the feasibility of space missions by leveraging resources available in space rather than relying solely on Earth-launched supplies. They aim to solve the logistical and economic challenges associated with long-duration space missions by developing technologies that allow astronauts to produce propellant, water, oxygen, and other essential resources from lunar, Martian, and asteroidal materials. Their unique value proposition lies in their deep expertise in chemical engineering, advanced materials, and space systems combined with a strong focus on practical, scalable solutions for resource extraction and processing in extreme environments.

**Technology Focus:**

* Lunar Ice Mining & Processing:\*\* Development of systems for extracting water ice from the lunar surface and converting it into propellant (liquid oxygen and liquid hydrogen). Key technologies include cryogenic ice excavators and advanced electrolysis systems with estimated H2/O2 production capacity scaled to support lunar lander refueling.
* Asteroid Resource Utilization:\*\* Development of robotic systems and chemical processes for extracting valuable resources, such as water, metals, and propellant precursors, from near-Earth asteroids. Focus is on developing compact, autonomous processing units capable of operating in microgravity and harsh radiation environments.

**Recent Developments & Traction:**

* NASA SBIR Awards:\*\* Awarded multiple NASA Small Business Innovation Research (SBIR) contracts in 2022 and 2023 related to lunar resource extraction technologies, particularly for advanced regolith processing and water electrolysis.
* Propellant Production Demonstrations:\*\* Reportedly demonstrated laboratory-scale production of rocket propellant from simulated lunar regolith using their proprietary chemical processes, showcasing the feasibility of their ISRU technology.
* Partnership with Colorado School of Mines:\*\* Partnered with the Colorado School of Mines on research projects related to asteroid mining and propellant production, leveraging the university's expertise in mining engineering and space resources.

**Leadership & Team:**

* Robert Zubrin (President):\*\* Known for his advocacy for human space exploration and Mars colonization. Founder of the Mars Society and has a long history of proposing innovative space mission architectures.

**Competitive Landscape:**

* Masten Space Systems:\*\* Develops reusable vertical takeoff, vertical landing (VTVL) spacecraft and lunar landers. Competes in the area of lunar surface operations, where ISRU-produced propellant could significantly enhance their capabilities. Pioneer Astronautics differentiates itself with its dedicated focus on the specific technologies required for in-space resource extraction and processing, which can be integrated with other landing systems.

**Sources:**

1. https://www.pioneerastro.com/

2. https://www.nasa.gov/directorates/spacetech/sbir/success\_stories/pioneer\_robot\_miner/

3. https://www.marsinstitute.org/staff/robert-zubrin/