Infrastructure Along the Last Mile: Modular Mobility to Build the Space Resources Economy. K. Randell[1], M. Shar[2]. [1]Venturi Astrolab, Inc. 12536 Chadron Ave, Hawthorne, CA 90250. kelly.randell@astrolab.space. [2]Venturi Astrolab, Inc. manny.shar@astrolab.space.

Introduction: Astrolab is a multi-planetary mobility and logistics company on a mission to move humanity forward to the next horizon by designing, building, and operating a fleet of multi-purpose rovers for all planetary surface needs. The Flexible Logistics & Exploration (FLEX) rover was designed from the outset as a utility platform to serve near- and longer-term commercial and government needs—both crewed and uncrewed (Figure 1).

Its unique crouch-and-lift payload attach and deploy concept enables Astrolab to serve a range of customers and use cases, from science and exploration to logistics, resource extraction, and construction. This feature also facilitates building infrastructure at scale with multiple FLEX vehicles working in tandem to deploy and move large cargo (e.g., lunar habitats), perform lander relocation, or support long-term in-situ resource utilization (ISRU) activities.

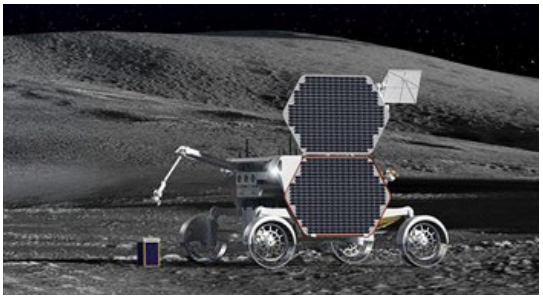

Figure 1: The FLEX platform is optimized for ISRU operations, from resource extraction to construction

Mobility for the Last Mile: Sustained ISRU operations will need large-scale utility vehicles designed for heavy, multi-year use. Astrolab designed its FLEX rover to be configurable for resource extraction, construction, sample collection, infrastructure deployment, and logistics services—all on a single commercial platform.

We will provide an update on the FLEX Lunar Innovation Platform (FLIP) mission [1], launching no earlier than July 2026, which is a robotic precursor mission and technology demonstration for Astrolab's larger FLEX rover (Figure 2).

Astrolab has manifested more than a dozen payloads on FLIP, including science instruments associated with four separate NASA centers, as well as commercial ISRU customers. FLIP will carry out important investigations for dust, perception, lunar environments, and regolith composition.

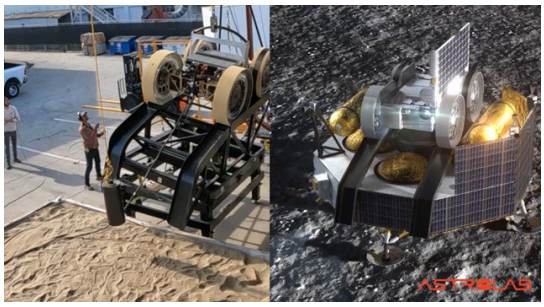

Figure 2: The FLIP rover egressing from Astrobotic's Griffin lander (left: FLIP test vehicle; right: render of FLIP egress onto the lunar surface)

Astrolab will also discuss its larger FLEX platform, including ongoing work with commercial ISRU companies [2] and its upcoming commercial mission (Figure 3), launching as soon as 2028 [3]. Astrolab's FLEX rover has three modular payload interfaces and is capable of transporting up to 2,000 kg of payload mass in the 3 m^3 volume under its horseshoe-shaped chassis.

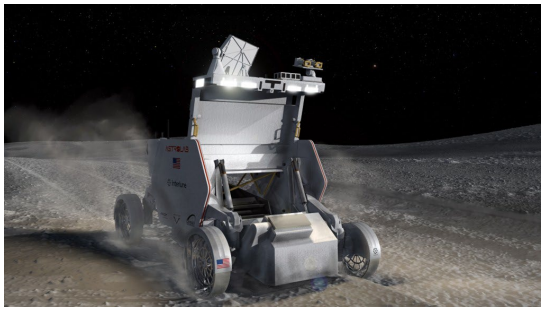

Figure 3: Interlune and Astrolab are collaborating on harvester technologies to support sustained operations for helium-3 extraction

Building the Space Resources Economy: Astrolab designed FLEX as an adaptive utility vehicle capable of evolving with the growing lunar economy. Our stepwise approach to technology maturation—with robotic precursor missions using FLIP and FLEX—demonstrates the resilience of the FLEX vehicle architecture. FLEX represents an ideal platform for ISRU operations and infrastructure development.

References: [1] Astrolab. (2025) "Astrolab's FLIP Rover Joins Astrobotic's Griffin-1 to the Moon." https://www.astrolab.space/2025/02/05/astrolabs-flip-rover-joins-astrobotics-griffin-1-to-the-moon/

[2] Berger, E. (2026) *Ars Technica*. "As Moon Interest Heats Up, Two Companies Unveil Plans for a Lunar Harvester."

https://arstechnica.com/space/2026/03/as-moon-interest-heats-up-two-companies-unveil-plans-for-a-lunar-harvester/

[3] Astrolab. (2023) “Payloads to be Launched on Upcoming SpaceX Mission to the Moon.” https://www.astrolab.space/2023/11/21/payloads-to-be-launched-on-upcoming-spacex-mission-to-the-moon/