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Introduction: Lunar Node 1 (LN-1) is an S-band navigation beacon for lunar applications that was recently designed and built at NASA Marshall Space Flight Center. As part of NASA's Commercial Lunar Payload Services initiative, this beacon will be delivered to the moon's surface on Intuitive Machine's NOVA-C lunar lander in early 2022. During this mission, LN-1's goal will be to demonstrate navigation technologies that can support local surface and orbital operations around the moon, enabling autonomy which would decrease dependency on heavily utilized Earth based assets like the Deep Space Network. To do this, LN-1's design leverages Cubesat components as well as the Multi-spacecraft Autonomous Positioning System (MAPS) algorithms, which enable the autonomous spacecraft positioning through communication-integrated navigation measurements. In addition to demonstrating the MAPS payload, the radio will also be used in PN-based one-way non-coherent ranging and Doppler tracking to provide alternate approaches and comparisons for navigation performance. LN-1 will represent a single node in a potential greater MAPS network of assets. The LN-1 design details, status, and potential forward work with subsequent missions like LN-2 will be outlined in this presentation.

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