

THE SKINNY

L3VIN, or Lunar-Laser-Lab for Volatiles **IN**vestigation

L3VIN



- An In-Situ Laser Induced Breakdown Spectroscopy (LIBS) instrument that incorporates spatial mapping and micro-imaging optical assemblies in a low SWaP form factor to determine elemental composition across regolith and rocks using a wide UV to Near Infrared (NIR) spectral range.



CONOPS and TECHNOLOGY

As stand-off LIBS instrument with focus between 0.1m and 1.4m, L3VIN performs 2.5D high-resolution mapping of unprepared surfaces by focusing a laser onto a 100mu target which ablates and produces spectral emission features unique to each element.

L3VIN uses gimbal-less 2-axis MEMS micromirrors for laser beam steering and an automatic micro focus mechanism for combined point, line, or grid scanning

CURRENT TEST READINESS LEVEL (TRL)

- Instrument at TRL4, TRL6 in late 2023
- Subsystems at TRL6 & TRL9

POSSIBLE PLANETARY MISSIONS

CLPS / ASTROLAB / Endurance A / MLE

L3VIN is designed for geological characterization in a CLPS mission to determine elemental composition and textural/morphological information. The instrument is also relevant to the METRIC concept as well as moon sample return missions

including the ASTROLAB. Textual and elemental information may also be relevant to the Mars Life Explorer mission in the search for biosignatures in Martian ice

Expected Flight SWaP
2U, 8kg, 18W

L3VIN performance (preliminary)

Spectral range	250-970 nm
Focus range	0.17 to 1.34 m
Angular scanning	+/- 6 degrees (x/y)
Imaging field of view	2.8 degrees

COMPARISON TO STATE OF THE ART

L3VIN uses 3 spectrometers to detect a wide spectral range from UV to NIR covering most Lunar elements of interest. It has a very low SWaP and reduces component failures by using very few moving parts

