



Path to the First Flight of the SL-OMV

Christopher Loghry – Moog Space Vehicles

August 11, 2022

MOOG PROPRIETARY WARNING

This technical Data/Drawing/Document contains information that is proprietary to, and is the express property of Moog Inc., or Moog Inc. subsidiaries except as expressly granted by contract or by operation of law and is restricted to use by only Moog employees and other persons authorized in writing by Moog or as expressly granted by contract or by operation of law. No portion of this Data/Drawing/Document shall be reproduced or disclosed or copied or furnished in whole or in part to others or used by others for any purpose whatsoever except as specifically authorized in writing by an authorized signatory of Moog Inc. or Moog Inc. subsidiaries.

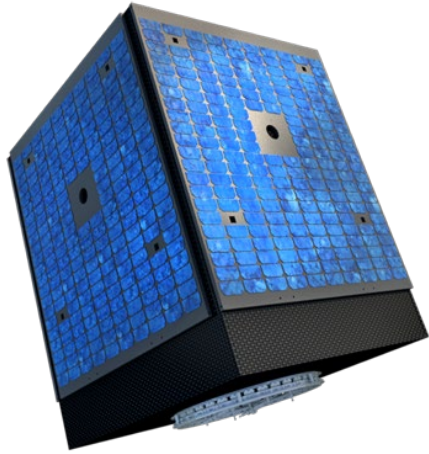
TRADE COMPLIANCE

This document, including all enclosed slides, consists of general capabilities information that is not defined as controlled technical data under ITAR Part 120.10 or EAR Part 772

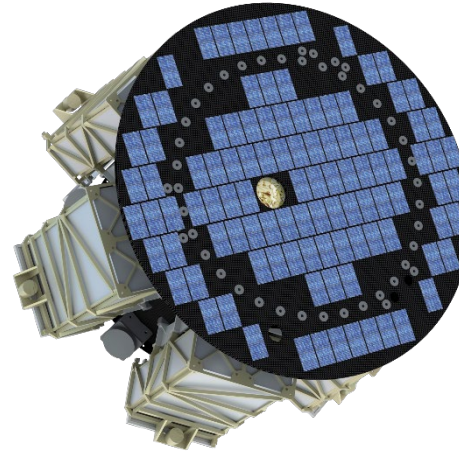
MOOG

Moog Space Vehicles Family

ASTEROID



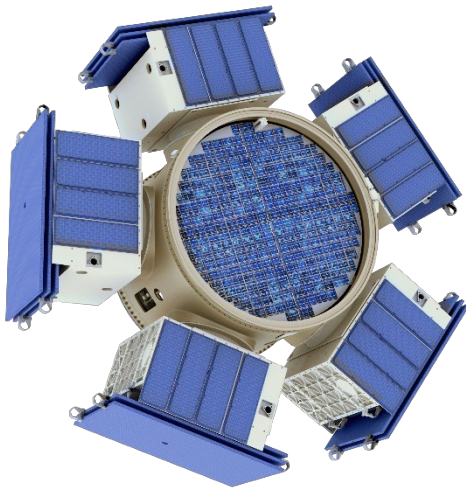
SL-OMV



METEORITE



COMET and COMET-HPP



METEOR



ASTRO and ASTRO Plus



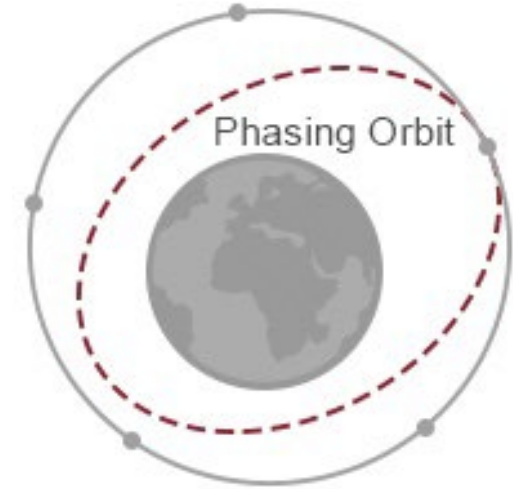
Mission Types Enabled by OMV



Change Altitude



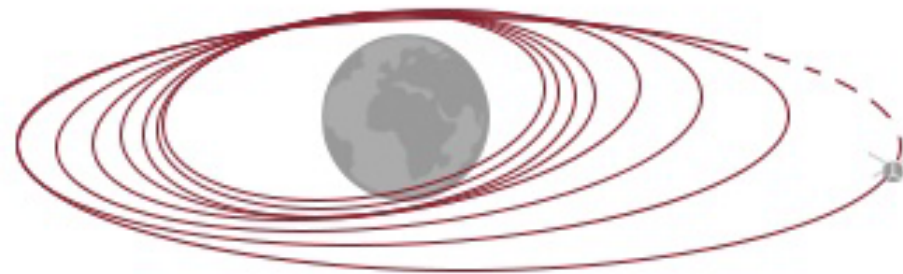
Change Inclination



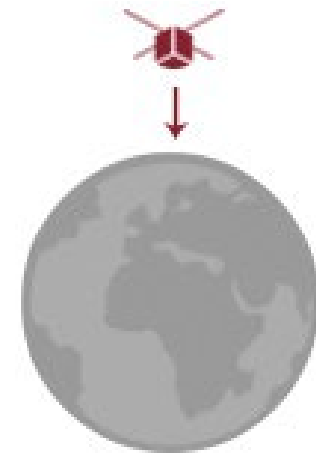
In-Plane Phasing



Multi-Plane
Deployment



Liquid Insertion Stage



Hosted Payload

July 16, 2018 – A Big Day for the SL-OMV

Lockheed Martin selects ABL Space Systems for UK launch

by Jeff Foust — February 7, 2021



The UK Pathfinder launch by Lockheed Martin from the Shetland Space Center in 2021. ABL Space Systems. Credit: Lockheed Martin

Courtesy of SpaceNews

- Program announced on July 16, 2018
 - Same day in 1969 Apollo 11 launched
- In early 2021 launch site and launch vehicle announced
- ABL RS1 from SaxaVord in early 2023
 - SaxaVord is located in Shetland Islands off the north coast of Scotland
- Other launch vehicles planning to launch from the UK
 - Vertical: Orbex, Astra, Skyrora
 - Horizontal: Virgin Orbit, Astraïus

Lockheed Martin To Help UK Space Agency Build First Commercial Spaceport; Launch First Orbital Rocket

First vertical launch from Scotland planned for the early 2020s.



FARNBOROUGH, England, July 16, 2018 /PRNewswire/ -- The UK Space Agency has selected Lockheed Martin (NYSE: LMT) to help implement its vision for the UK Spaceflight Programme, an innovative initiative to create a world-leading commercial launch market that grows the UK economy through regular, reliable and responsible access to space.

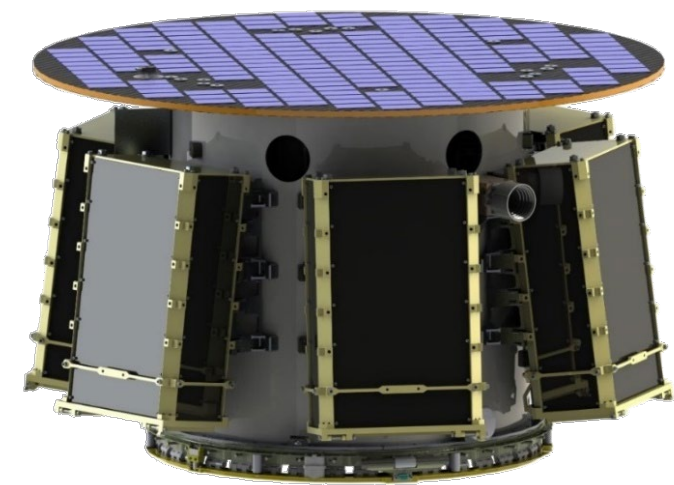
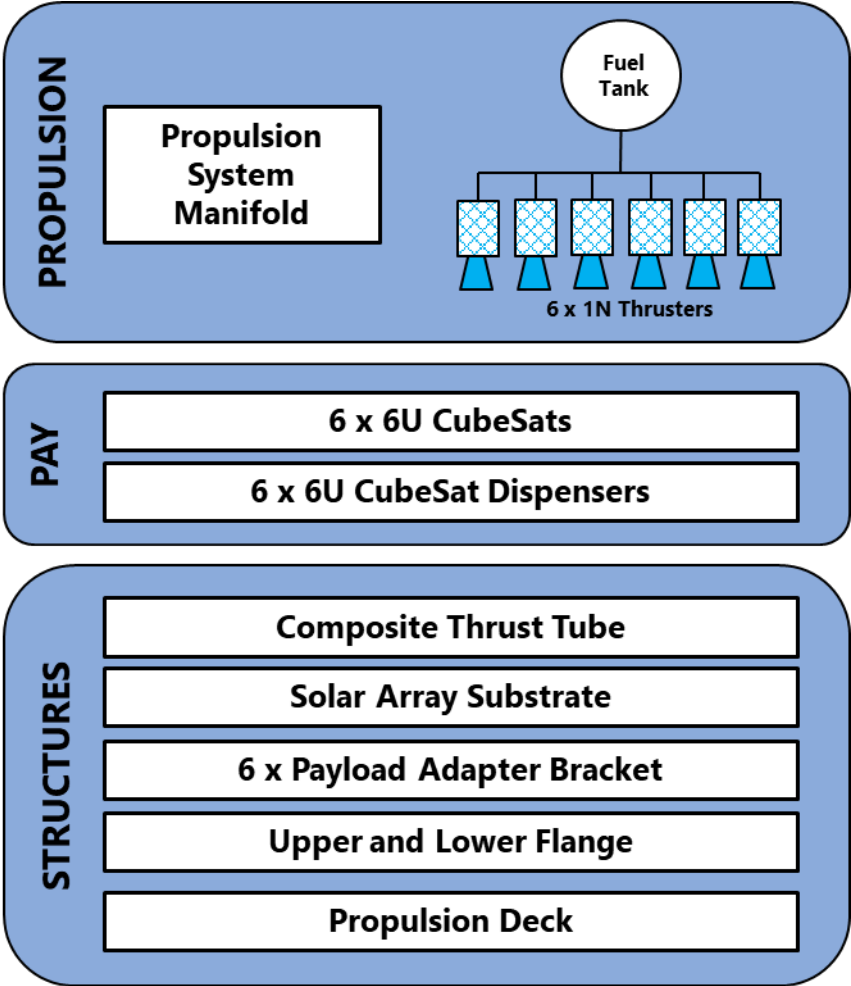
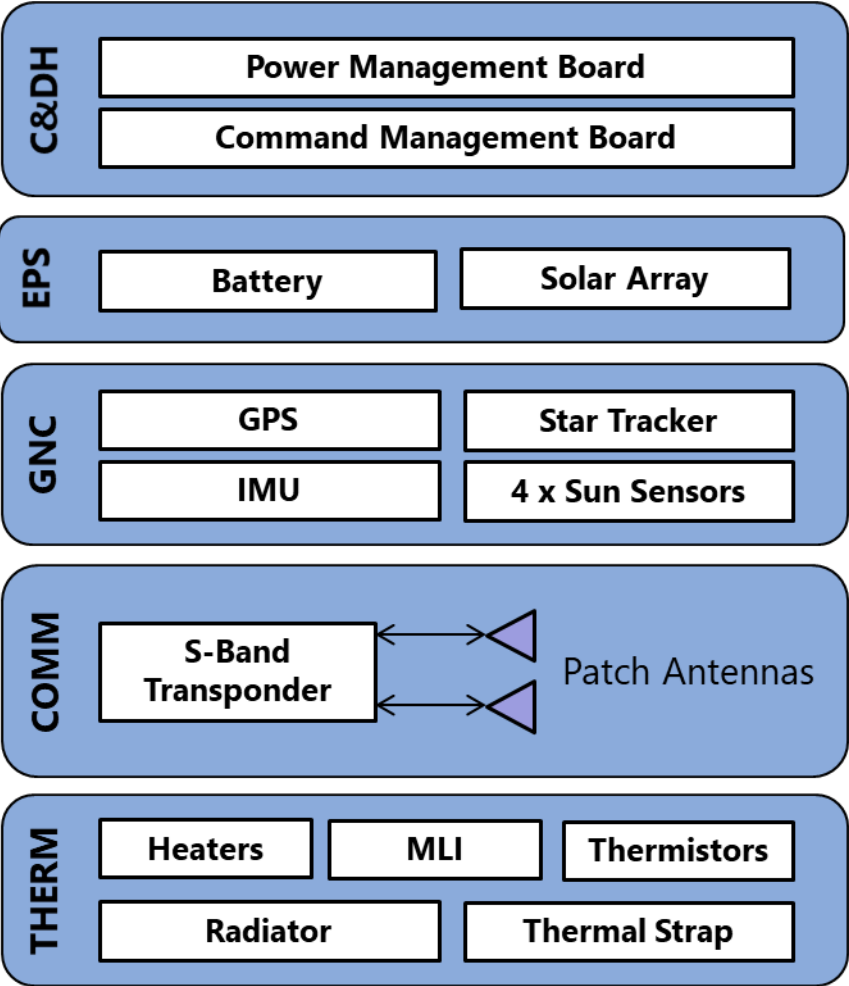
"The countdown to the first orbital rocket launch from UK soil has officially begun," said Patrick Wood, Lockheed Martin's UK Country Executive for Space. "The UK Government has stated its desire to grow the UK's space sector to ten percent of the global space economy by 2030. We are proud to be selected to help them achieve this goal. This initiative will not only spark advancements in science and innovation, it will create new opportunities for current and future UK-based suppliers to become part of the next space age."



Courtesy of
Lockheed Martin



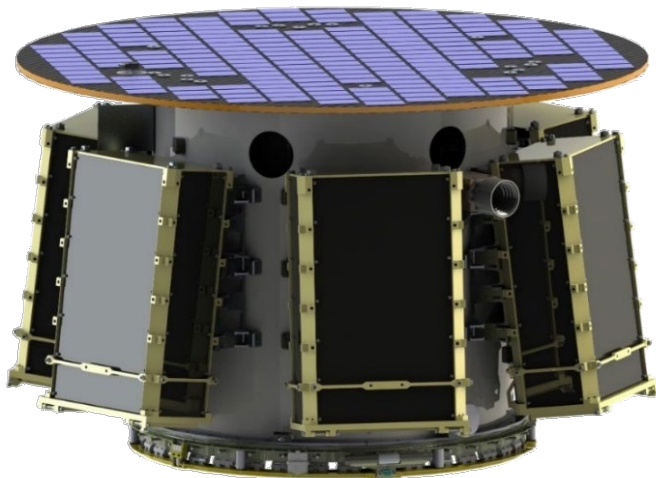
SL-OMV Summary



Subsystem	Mass (Current Best Estimate) kg
Vehicle Dry Mass	62.7
Propellant	13.0
Vehicle Wet Mass	75.7
Payload	90.1
TOTAL	165.8

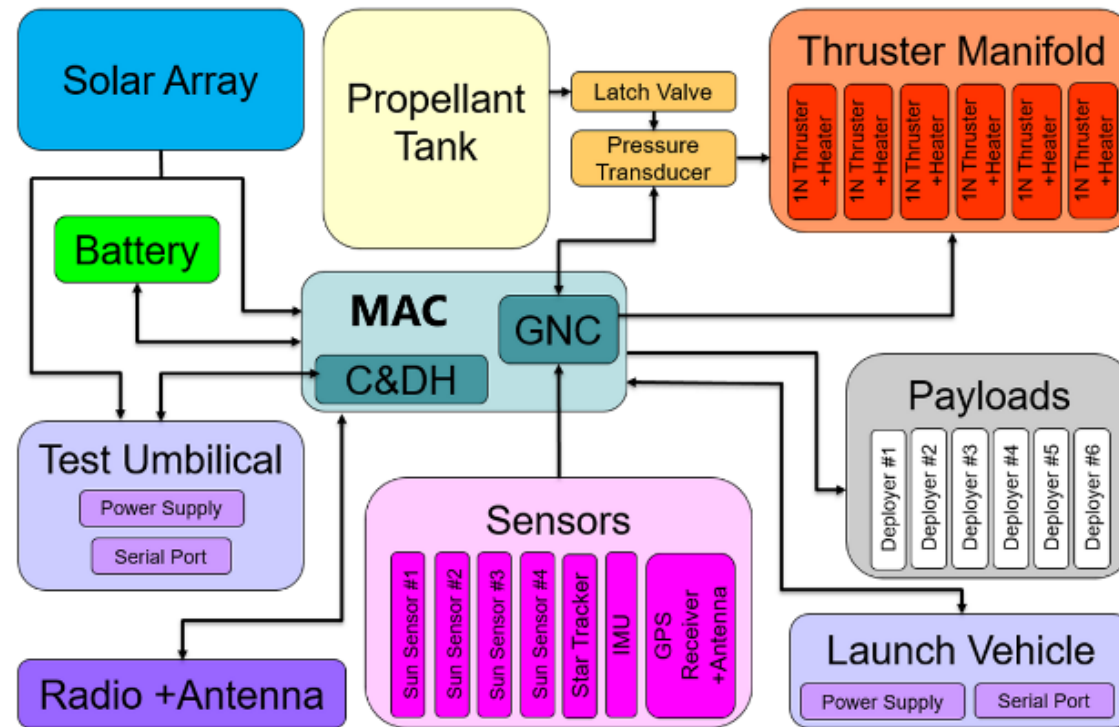
Key SL-OMV Subsystems

Unique Solar Array configuration developed specifically for SL-OMV



Custom Carbon Fibre structure

Low Mass Dispensers qualified for the SL-OMV



Moog Main Avionics Computer (MAC)
I/O Block Diagram

Qualified for the SL-OMV application
leveraging TRL 9 designs



Moog Green Propulsion System

Components developed and qualified for the SL-OMV application leveraging TRL 9 propulsion technology

Summary

- Moog's line of Orbital Maneuvering Vehicles can support a wide variety of new and exciting mission applications
 - Support the boom in Small Satellites and Rideshare
- Small Launch OMV (SL-OMV) currently under contract and in production for launch from the UK for the UKSA with mission partner Lockheed Martin
- SL-OMV is a straightforward design leveraging existing and new technologies that have applications elsewhere in the industry
- Joint UK/US team and supply chain including bringing new capabilities to the UK
- Moog expanded its capabilities in Reading specifically to support the SL-OMV program and looking to support more opportunities in the UK
- SL-OMV is in current Integration and Test phase with delivery later this year

Effects of MMDS ON Moog SV Division

- Now that the public rev is out, we are looking to use that as a generic requirements set in lieu of GEVS or similar for requirements to support our larger tug product family COMET

Contact

Please contact us with any questions, potential applications, or applicable technologies you would like to discuss

- US - Chris Loghry – Moog Space Vehicles Business Development Manager
 - cloghry@moog.com
 - +1 720-289-7041
- UK – Jono Macrow – Moog SDG UK Sales Account Manager
 - jmacrow@moog.com
 - +44 (0)7973 772 195