

LEROS 1c Apogee Engine

- Bipropellant Liquid Thruster



The **Nammo Space** designed and manufactured **324 second Isp**, MON/ Hydrazine dual mode apogee engine delivers a thrust of **458 N**.

This engine has been sold in large numbers (with more than 60 engines delivered) and is the most successful dual mode apogee engine supplied.

The **LEROS 1c** has been used for both interplanetary and Earth orbit missions.

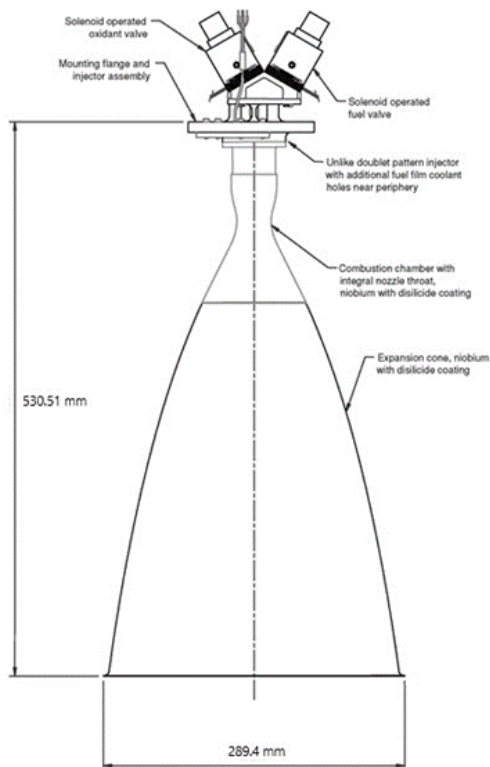
The LEROS 1c is renowned for its reliability and high

performance. It is the first choice for satellite primes throughout the world and is very price competitive.

The base material for the thrust chamber and expansion cone is C103 Niobium alloy, coated with R512E Disilicide for oxidation protection.

All Nammo apogee engines are hot-fire tested in the UK **National Space Propulsion Test Facility** at Nammo Westcott.

Delivery timescales are typically 12-18 months.



LEROS 1c envelope dimensions



LEROS 1c was used for the NASA Lucy mission

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Typical Application	Apogee or Main delta V engine
Typical Operational Mode	Long duration burns: typically 3 x 5000 sec
Propellant	MON / Hydrazine
Thrust range	386 N to 470 N [87 lbf to 106 lbf]
Thrust at nominal inlet pressure	458 N [103 lbf]
Mixture Ratio Range	0.78 to 0.89 [oxidiser to fuel]
Mixture Ratio, nom inlet pressures	0.85 [oxidiser to fuel]
Specific Impulse	324 sec minimum
Total Impulse	13,200,000 Nsec
Propellant Throughput	4760 kg
Inlet Pressure Range	13 bara to 21 bara [190 psi to 300 psi]
Restarts Demonstrated	117 Chamber temp. <100°C [start], >1300°C [finish]
Maximum Duration Single Firing	>5,800 seconds performed in orbit
Cumulative Duration	>40,000 seconds demonstrated duration
Engine Mass	4.3 kg
Operating Temperature	1380°C maximum
Propellant Temperature	+10°C to +35°C
Storage Temperature	-53°C to +65°C
Storage Life	4 years
Operational Life	19 years
Reliability	0.995
Valve Type	2 off Solenoid, Single Seat, Redundant Coil
Qualified Valve Cycles	10,500 on/off cycles
Valve Voltage per coil	27.5 Vdc to 35.5 Vdc
Technology Readiness Level	TRL9

Note: The valve can be connected fuel/oxidiser primary coils in parallel (28Vdc nom) or in series (70Vdc nom)



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