The HOMER cavity is a Positive Branch Unstable Resonator (PBUR), employing a Graded Reflectivity Mirror (GRM) with a Gaussian reflectivity profile. This produces high beam quality (TEM00) and produces high pulse energies typical of Master Oscillator/Power Amplifier (MOPA) designs, but with higher efficiency, less optics, less volume/mass, excellent pointing.

**Parameter** | **HOMER Output**
--- | ---
Energy | 17 - 9 mJ
Pulse Width | 10 +/- 1 ns
Rep Rate | 250 - 100 Hz
LDA Duty Cycle | ~2%
LDA Current | 50 A
LDA Derating | 50%
TRL 6 Mass | 5 kg
Total QS Shots HOMER Design | 15+ Billion
Optical Efficiency | 17%
Elect Efficiency | > 7%

**Environmental Testing:**

The General Environmental Verification Standard (GEVS) qualification vibration specification was applied. Purpose of this test was to qualify the HOMER design through TRL 6 vibration testing. Since no launch vehicle was selected at that time, the HOMER was designed for a 0°C to 40°C survival temperature range. Therefore using GEVS component qualification standards HOMER was temperature cycled to -10°C for 4 hours and then to 50°C for 4 hours at total of 8 times. HOMER’s performance was checked at regular intervals to assure proper laser output quality.

**TVAC Testing:**

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**Final HOMER Design:**

Now that HOMER is the GEDI laser, it is being mechanically upgraded; incorporating a beam expander, improved optical bench, and a flight-like laser electronics box. The ETU and flight laser systems will be built in-house and will go through environmental testing.

**Optical Layout of the HOMER-2 Lifetest:** A 1064nm fiber-coupled laser diode is reflected off reference cubes mounted on the enclosure and the base plate. These determine any movement of laser cavity vs. the outside environment.

**TEM00 HOMER Beam Quality:** This CCD image simultaneously displays all reference beams and the HOMER-2 far field beam. The far field (largest beam) measures approximately 0.9 mR x 1.0 mR divergence.

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