Photonics Industries International, Inc.

Lasers for Satellite Laser Ranging (SLR) Applications

Joyce Kilmer, PhD, Photonics Industries, Bohemia NY

Photonics Industries' RGL Series of picosecond (ps) laser are well suited for the **Next Generation Satellite Laser Ranging System (NGSLR)**

- Laser requirements:
  - Subnanosecond pulse width
  - Asynchronous PRF - 2 kHz
  - Software controllable

RGL 532-2.5 LP

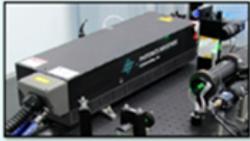|	
Wavelength:	532nm
Power level:	5W @ 5kHz
Repetition rate:	Single Shot to 5kHz, external trigger
Pulse energy:	2.5mJ/pulse @ 2kHz
Pulse width:	50ps (Nominal)
Pulse to Pulse Stability:	< 2% rms
Spatial mode profile:	TEM00, M2 < 1.3

And have been successfully used by **NASA** as described in:

"An Overview of Satellite Laser Ranging (SLR)"
Jan McGarry NASA / GSFC / 694
June 2012

http://space-geodesy.nasa.gov/docs/2012/OverviewSLR_mcgarry_120606.pdf

NGSLR: New Photonics Industries Laser

Parameter	Reported by PI	Measured
Pulse Energy	2.76 mJ	2.7 mJ
Wavelength	532 nm	532.19 nm (measured IR at 1064.38)
Far Field Beam Divergence	1.13 mrads	0.856 mrads avg, 0.672 x 1.007 mrads
Near Field Spot Diameter	2.92 mm @ 1000 mm	2.5 mm x 3.4 mm @ 1350 mm
Pointing Stability	<5 urads	4.6 urads x 7.8 urads (full angle)
Pulse Width	~50 ps	< 150 ps (equipment limitations)
Transmitter Delay	Not Specified	336 ns
Warm Up Time (energy level)	<15 minutes to reach 100%	90% @ 8 seconds, 95% @ 70 seconds, 100% @ 12 minutes

8 hours performance test gave good results.

NGSLR: New Optical Bench Design

Reasons for new optical bench:
- Ease of system alignment
- Add automation
- Replace optics needed for higher power laser

NGSLR: Optical Bench in B33 Cleanroom

Just starting the optical bench layout. PI laser is at the far end of the bench.

Slides provided courtesy of Jan McGarry, code 694, NASA Goddard Space Flight Center