Advanced Solid State Laser Systems for Space Tracking

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EOS Advanced Solid State Laser Systems in Operation

• A Pico-second pulse width system for Satellite Laser Ranging (SLR)

• A Nano-second pulse width system for tracking uncooperative targets

Both systems have been in operation for more than 2 years with excellent performance and reliability
A new generation of advanced solid state laser systems have been developed for satellite laser ranging and tracking uncooperative targets by EOS since 2003

- Complete diode pumped – higher electro-optical efficiency
- Excellent Beam Quality at High Repetition Rate – x1.15 Diffraction limited
- Excellent beam pointing stability - <1 aocrsec
- Integrated many most advanced solid state laser technologies
- high stability and reliability
- extremely low level of maintenance
EOS SLR Laser System

- Consisting a mode-locked laser oscillator, a regenerative amplifier, a power amplifier and a SHG
- Semi-Conductor Saturable Absorption Mirror, developed by EOS in collaboration with ANU as passive mode-locker
- System can be upgraded to eyesafe wavelength @ 1.57 μm by implementing OPG and OPA

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<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
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<tbody>
<tr>
<td>Pulse width</td>
<td>10 ps</td>
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<td>Wavelength</td>
<td>532 nm</td>
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<tr>
<td>Repetition rate</td>
<td>1 - 100 Hz with power amplifier</td>
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<td>1 - kHz regenerative amplifier only</td>
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<tr>
<td>Pulse energy @ 532 nm</td>
<td>14 mJ @ 100 Hz</td>
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<td>0.6 mJ @ 1 kHz</td>
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EOS SLR Laser System
EOS High Power Nano-second Laser System

Advanced Technologies Integrated

- Complete Diode Pumped
- Single Frequency Oscillator
- Phase Conjugate Mirror (Stimulated Brillouin Scattering or SBS Cell) for wavefront distortion compensation, pulse width and pulse shape controls
- Imaging Relay for beam quality, and polarization controls
- Ultra-stable mechanical mounts
EOS High Power Laser System
Other Advanced Solid State Laser Systems Under Development

- Sodium guide star laser system based on direct sum frequency mixing of the two spectral lines of Nd:YAG at 1064 and 1319 nm to generate light at 589 nm
- 2 kHz and 2 kilo-watt, repetition rate variable, pulse width variable system for space related applications