

# IRIS™ 1000 *Tunable Middle Infrared Laser*



## IRIS™ 1000 System Overview

The wait for a turnkey room temperature tunable middle infrared laser source is over. NovaWave introduces the IRIS™ 1000, the World's first commercial DFG-based middle infrared laser. NovaWave's new IRIS™ 1000 is a single longitudinal and transverse mode tunable laser system that provides high spectral purity, collimated laser light in the "fingerprint" C-H, N-H, and O-H stretch region of the middle infrared. The IRIS™ 1000 laser produces MHz-linewidth, stable infrared laser light without the use of cryogenics and provides mode-hop free tuning over a broad range due to its unique Difference Frequency Generation (DFG)-based architecture.

The IRIS™ 1000 is suitable for high resolution spectroscopic applications such as Doppler limited absorption spectroscopy. The system features high polarization purity, TEM<sub>00</sub> transverse mode quality, and output powers suitable for use with optical multipass cells and non-cryogenic detectors. The system features an external modulation

capability to greater than 1MHz, a built-in copropagating visible alignment laser, and on-board touch screen computer control with Ethernet remote control capability.

### Performance Features

- Single frequency (MHz linewidth)
- TEM<sub>00</sub> output
- Tunability in the 3.2-3.6 micron region
- 150μW to mW output power levels
- Approximately 100nm tunability per head with expandability
- User-swappable DFB diode laser for quickly accessing new wavelengths
- Built-in, copropagating visible alignment laser for easy set-up
- External modulation capability for FM spectroscopy (DC to >1MHz)
- On-Board computer system
- Intuitive touchscreen interface
- Versatile Ethernet remote control
- Linux OS is easily interfaced to numerous platforms including Labview™

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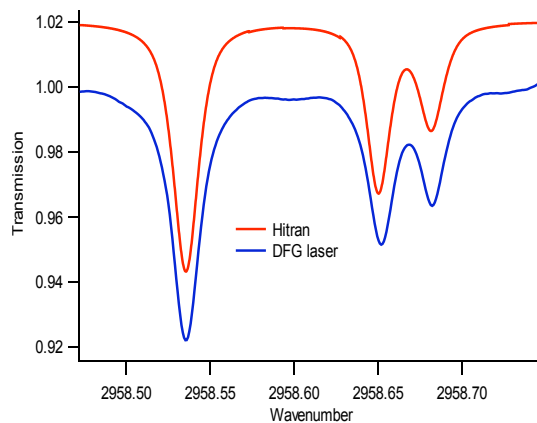
# IRIS™ 1000 *Specifications and Features*

Wavelength <sup>1</sup> :	3200nm-3600nm
Linewidth:	<3MHz
Output Power <sup>2</sup> :	150µW to mW
Frequency Stability <sup>3</sup> :	20MHz
Beam Diameter (1/e <sup>2</sup> @ 0.5m):	2.1 (+/- 0.2) mm
Beam Divergence:	1.2 mrad
Alignment Laser Frequency:	635-645nm
Alignment Laser Power:	<1mW
Power Requirements:	110VAC, 100W <sup>4</sup>
Weight (kg):	14.3 kg (with head)
Size, Controller (inches):	17x15x6 (3U rackmount)
Size, Head (inches):	7.0 x 4.0 x 2.5 (LxWxH)
Interlocks:	Internal and External
Modulation Voltage:	0-2V
Modulation Frequency:	DC to 1MHz
Interfaces:	Touchscreen, Ethernet, Labview™

- 1: 100nm coverage in Base configuration  
 2: Higher power versions available, Base is 150µW  
 3: Long-term stability measured over 4 hours  
 4: Surge suppression/battery backup recommended

## Applications:

- High resolution molecular spectroscopy
- Greenhouse gas monitoring
- Combustion Diagnostics
- Industrial Gas sensing
- Optical metrology



**Above:** High resolution methane absorption spectrum obtained with the IRIS™ 1000 laser in the 3300 nm region, together with a simulated (HITRAN) spectrum. Literally hundreds of gases can be detected over the accessible tuning range of the system. The single frequency nature of the laser assures the accurate determination of the integrated lineshape, thereby enabling the precise determination of absolute species concentrations.



**Above:** User accessible laser enables the “signal” wavelength to be quickly changed to generate new difference frequencies. **Below:** The compact remote laser head features a copropagating visible laser to facilitate system use on the bench.

