

News Feature

Multiple Control Loops Stabilize DFB Laser

DISTRIBUTED-FEEDBACK (DFB) lasers are known for their precise wavelengths and narrow linewidths. But the AG-1 DFB laser from Sabeus, Inc. offers about 100 times the precision of a comparable diode laser without the bulk, complexity, and cost of laser isolation systems. The AG-1 features the firm's patent-pending Multi Variable Control System (MVCS) technology for dynamic signal feedback and stable operation even in hostile military environments.

The AG-1 DFB laser is part of Sabeus' line of Precision Advantage™ optical components. It employs multiple feedback loops to produce an effective linewidth of 10 to 400 kHz and frequency stability of ±5 MHz—approximately two orders of magnitude better than state-of-the-art semiconductor lasers. The narrow linewidth translates into extremely high signal coherency, providing high measurement accuracy over long distances. The AG-1 is tunable across C and L bands, offering a

tuning range of up to 3 nm and minimum step size of 0.5 pm.

Since it is a laser-based system, the AG-1 offers many benefits for military applications. It is suitable for sensitive sensing systems based on interferometer techniques that are used to measure sound or pressure waves. In many such military applications, such as submarine detection, measurements of water pressure are performed by means of interferometer sensing, with one optical cable as a sensor and the other as a reference. Changes in the output power of the sensing cable are compared to the output power of the reference to determine changes in water pressure and the possible presence of a submarine.

Signal phase and frequency are critical in optical interferometer measurements because of their insensitivity to distance compared to other optical parameters, such as frequency and polarization. The AG-1 exhibits low phase noise for precise



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results even under stressful environmental conditions. It provides high frequency stability to maintain accuracy, and is not subject to microphonics so that noisy environments will have minimal impact on the AG-1's measurement accuracy.

In military and Homeland Security applications, the AG-1 is ideal for harbor and perimeter security, and towed and fixed arrays. It provides a new level of reliability for fiber-optic surveillance systems.

The AG-1 delivers output power of 10 to 50 mW while typically consuming just 4 W power. It measures just 3 × 4 × 0.5 in. (76 × 102 × 12.7 mm) and weighs just 9.2 oz (261 g). The compact package includes TE cooler, laser driver, power regulator and embedded microprocessor for control.

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NEXT ARTICLE ▶
 News 1