

## Futonics achieves a new laser power source featuring 500 W in continuous mode

### Challenge

For highly efficient laser weeding, Futonics developed a 500 W fibre laser source within the WeLASER project. The laser source is based on a Thulium laser, that emits at an emission wavelength of 2  $\mu\text{m}$ . The goal of the project for the laser source was to make the system more robust, more efficient, lighter, and even cheaper than before.

### Achievements

Futonics realized a new 500 W Thulium fiber laser system with an emission wavelength of 2  $\mu\text{m}$ . With the minimization of power losses on all components and a new cooling concept, the new laser system reached an electro-optical efficiency of 16 %. Mounted on an autonomous vehicle with a 48 V DC power supply, an overall efficiency of 15 % is achieved. The laser is equipped with an application fibre with a length of 10 m, which preserves the single-mode beam quality of  $M^2 < 1.2$  and enables flexible beam delivery. The 500 W laser source uses the same housing as the 250 W fibre laser system by Futonics, (dimensions: 705 x 437 x 177 mm<sup>3</sup>). This makes it easy to mount the laser in conventional 19" rack systems. For continuous operation, the new laser source needs a power supply that provides 70 A at 48 V and a water-cooling system with about 3 kW cooling capacity.



*High-power fibre laser for weed control*

### Practical conclusions

Futonics new 500 W continuous, 2  $\mu\text{m}$  laser system, offers increased output power from the same laser package as the 250 W system. By maintaining the high beam quality of  $M^2 < 1.2$  a more powerful beam spot is achieved. With an adapted scanner optic, a spot diameter  $< 0.5$  mm in a distance  $> 0.5$  m can be realised. Using this new high-power laser, weeds can be completely killed with short pulses, which enables a high weeding speed. A fast laser control electronic enables precise pulsed applications with pulse rates up to 5 kHz.

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