

LASER DELIVERY SYSTEM

PANDA™ is designed to be a truly open-architecture LPBF platform, and as such, can accommodate a range of laser delivery options. This handout provides a brief summary of options available. Note that the Open Additive team can also configure a custom system with other lasers/optics for research or application-specific needs. We are also working with or seeking opportunities to work with leading suppliers of lasers/optics, using PANDA as a demonstration platform for emerging technologies and products with goal to rapidly transition these new capabilities as future PANDA options.

STANDARD LASERS

Standard setup includes **IPG Photonics fiber laser (1070 nm) with either 500 W power (air cooled) or 1000 W power (includes external chiller)**. IPG lasers are considered industry leading, with high reliability and ease of use. The lasers are rack mounted in the system housing, with fiber connection to the optics above the chamber. The 500 W system provides ample versatility for most research, training/education, and production needs, while the 1000 W option provides additional capability for R&D related to advanced processing strategies or processing very high melting point materials like refractories. These standard power levels provide a significant performance jump compared to lower cost laser powder bed systems on the market, which sacrifice laser power and/or quality, thus limiting their potential. Note that the 1000 W laser requires a second 200-240V/20A single phase circuit for the chiller.



Figure 1. Single laser mounted in PANDA electronics rack

DUAL LASERS

While the typical PANDA setup is a single laser configuration, dual laser options are also offered as the PANDA control software is capable of controlling dual lasers/optics. However, dual laser process recipes with corresponding materials technical data for production applications are not currently available or planned. Thus, the dual laser setup is primarily aimed at the R&D community. Research avenues include multi-beam strategies for difficult materials, development of advanced stitching strategies, and use of non-standard secondary lasers for unique processing. Dual laser systems should be configured at time of purchase, due to the configuration impacts of adding the second laser. Thus, a reasonable integration fee will be charged if a second laser is to be added to a system already outfitted with just one laser.

SPECIALTY LASERS

Open Additive has deep expertise in integration and operation of a wide range of lasers such as green lasers (useful for processing copper, gold, and other materials with much higher absorption in the visible regime), ablative pulsed lasers (both nanosecond and femtosecond lasers, for in situ micromachining or other hybrid processing), and CO₂ lasers (with wavelengths on the order of 10 mm, useful for sintering non-metals such as high-performance polymer powders), from a variety of laser vendors. We can configure a system with custom laser setup to meet your research or application needs.

OPTICS OPTIONS

PANDA uses high-performance laser scanning systems from industry leading vendors, with two standard configurations offered. The lower cost option features a **SCANLAB hurrySCAN scan head and F theta lens**, mounted on a z-stage to allowing adjustment of the laser focus. Typical spot size is 40-100 μm depending on setup. As a more advanced option, PANDA can be outfitted with the recently introduced **SCANLAB fiberSYS “all-in-one scanning system”** which enables dynamic spot size control in a compact, modular design. The fiberSYS setup also includes an integrated coaxial sensor port (sensor not included) for melt pool monitoring possibilities. Dual laser configurations exclusively feature the fiberSYS setup because of its added capabilities and compact, simplified design. These options are shown below.

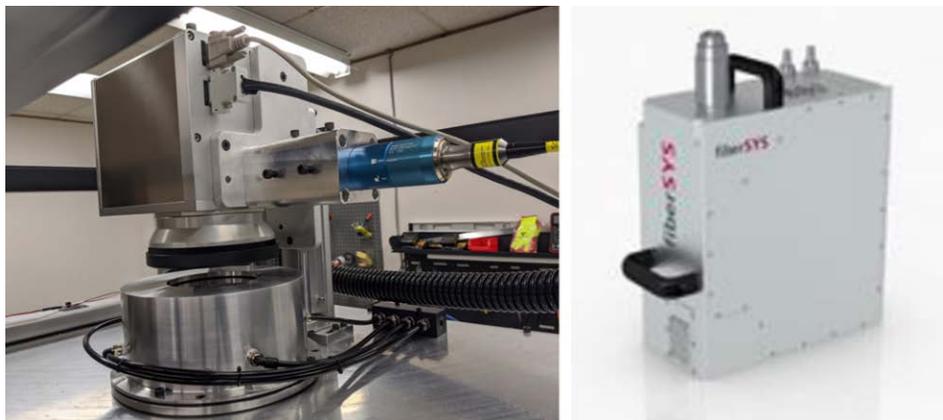


Figure 2. SCANLAB hurrySCAN, F theta lens, and z-stage (left), and SCANLAB fiberSYS system (right)