

DeepPIV Datasheet, v3.1

DeepPIV enables the quantitative visualization of fluid motion through particle tracking and particle image velocimetry (PIV; stationary mode), as well as 3D reconstructions (scanning mode). DeepPIV uses a laser sheet coupled to a high-resolution video camera to illuminate and record suspended particles moving in seawater. By mounting the instrument on a remotely operated vehicle (ROV) via a manipulator arm, fine positioning of the instrument can be achieved by an ROV pilot. With this system, quantitative visualizations of fine-scale fluid motion can be achieved from the sea surface to the maximum depth rating of the ROV.

System specifications:

General:

- Weight (Total/Manip): Dry 84.8/25.4kg (187/56 lbs); In-water 20.4/9.1 kg (45/20 lbs)
- Dimensions (OD/length): Camera (5.9/13.6 in), Laser Controller (8.4/29.4 in), Remote Laser (2.5/9.8 in)
- Operating temperature: 2-35 deg C
- Max depth rating: 4000 m

Imaging:

- Science Camera: Sony FCB-EV7320 with 20x zoom
- Max/Min FOV (at laser sheet): 54x30cm² / 3x2cm²
- AUX Camera(s): InSite Aurora/IT-1000, fixed zoom

Illumination:

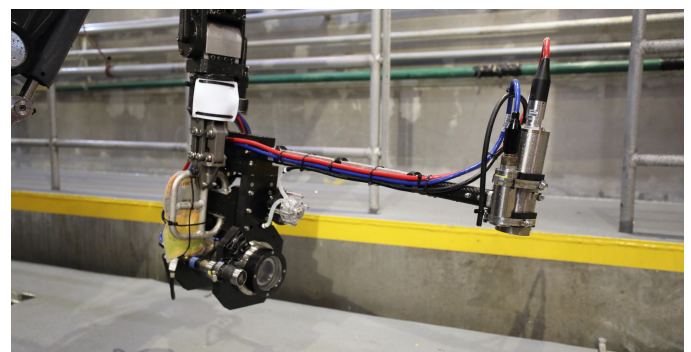
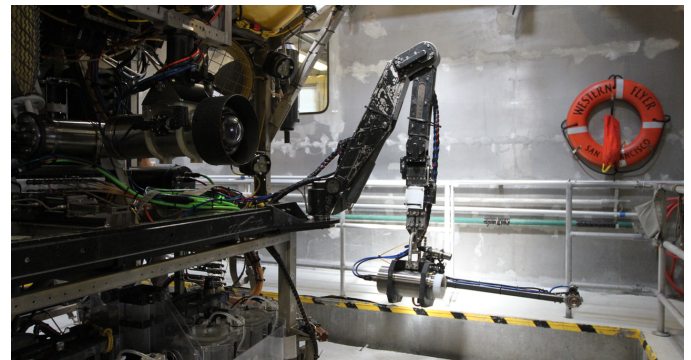
- Laser: LaserGlow 671 nm Continuous DPSS Laser (LRS-0671-PIO-01000-05 OEM)
- Max power output: 1.2 W
- Internal optics: Shafter collimator (60SMS-4-xx-K1) and LaserLine Optics 60 deg Powell Lens (LOCP_6_OR60_Narrow Beam)
- Full beam angle (in-water): 42 deg
- Sheet thickness: nominally 1 mm

Dye/Particle Injector:

- Pump motor: Maxon brushless DC EC-i 40
- Pump head: Cole-Parmer MasterFlex 7015-21
- Tubing size: L/S 15 (ID 4.8 mm)

Interfaces:

- Electrical/Communications (Cable Length):
 - Laser: GigE, 110VAC on MINK-10L (3m)
 - Laser fiber: 50 micron multimode (8m)
 - Camera: 3G-SDI, Serial, 24Vdc/2A on MINL-7L (5m)
 - Injector: 24Vdc/2A, Serial on MINK-10 (4m)
 - Laser/Camera: MINM-26 to MINK-10 (11.5m)
 - Aux camera(s): MINK-10 (6m)
- Mechanical:
 - T-handle bolted to manipulator
 - Laser controller mounted to core vehicle



(Top) DeepPIV affixed to the ROV *Doc Ricketts* manipulator arm in the (Center) midwater and (Bottom) benthic configuration.